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ABSTRACT

This report is a summary of a Master's thesis, entitled "Distance Education Technology and the Teaching-Learning Process in a Rural High School: A Case Study." The study explores the use of distance education technology in a small rural high school. More specifically, the study focuses on two issues: (1) students' approach to learning and their views about learning in the receiving classroom of a distance education project using compressed video technology and (2) the teacher's approach to teaching and his/her views about teaching in the sending classroom of such a project. Data was collected through observations and interviews in September and October, 1993 in the Law 30 class of two K-12 schools in the Wheatbelt School Division (Saskatchewan, Canada). Contextual description of the study is followed by portrayals of the six participants and a discussion of administrative, instructional, and technical considerations (class size, scheduling, examination supervision, class format, pace of instruction, students' advance preparation, classroom setup, camera and picture quality, and sound quality). The different approaches and viewpoints of each participant are highlighted. Findings from the study focus on the underlying themes of technology, interpersonal interaction, and the additional demands made by the technology on the teacher and students. The results of this study demonstrate the necessity of careful pre-planning and ongoing support of teachers and students for the duration of distance education classes. Suggestions are presented in these areas for boards of education, administrators and teachers. Diagrams of the sending and receiving classrooms are appended. (Contains 32 references.) (AEF)

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RESEARCH IN BRIEF

The Effects of Distance Education Technology on Teaching and Learning

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This report is a summary of a master's thesis by Julia Coutts entitled **Distance Education Technology and the Teaching - Learning Process in a Rural High School: A Case Study**.

The purpose of this study was to understand more completely the way a teacher teaches and high school students learn in a distance education classroom using compressed video technology. The types of teaching/learning strategies used by participants and their reactions to this experience were explored by the researcher. Using naturalistic research methodology, data was collected through observations and in-depth interviews in a small rural high school over two months in September and October, 1993. The school division had used compressed video technology for the previous two years but this was the first experience for the students in the receiving classroom of this study. A review of the literature includes findings of evaluations and descriptions from other similar distance education projects. A detailed contextual description of the study is provided. Findings are then presented in a case study which begins by presenting a portrayal of the six participants, followed by a description of numerous topic areas, highlighting the different approaches and viewpoints of each participant. Findings from the study focus on the underlying themes of technology, interpersonal interaction, and the additional demands made by the technology on the teacher and his students. These themes illustrate the necessity of careful pre-planning, as well as the need for on-going support of teachers and students throughout the duration of distance education classes. Specific suggestions are made in these areas which will be especially relevant for boards of education and their teachers and administrators.

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ABSTRACT

This study explores the use of a distance education technology in the teaching-learning process in a small rural high school. More specifically the study focuses on two issues: (a) how students approach learning and their views about learning in the receiving classroom of a distance education project using compressed video technology and (b) how a teacher approaches teaching and his views about teaching in the sending classroom of such a project. The data were gathered over 2 months during which the sending teacher and the five receiving students of the Law 30 class were interviewed. As well, observations were made in both sending and receiving classrooms through the duration of the study. Researcher coding categories were developed to organize the data. The findings are presented in a case study which begins by presenting a portrayal of the six participants. Then a description of the topic areas follows, highlighting the different approaches and viewpoints of each participant. The analysis deals with the underlying themes of technology, interpersonal interaction, and the additional demands made by the technology on participants. Because these themes illustrate the necessity of careful pre-planning, as well as the need for on-going support of teachers and students throughout the duration of distance education classes, suggestions are made in these areas.

TABLE OF CONTENTS

Page

ABSTRACT i
APPENDIX vi
INTRODUCTION 1
Background for the Study 1
Need for the Study 2
Purpose of the Study 3
The Focus 3
Definitions 3
METHODOLOGY 5
A REVIEW OF THE LITERATURE 7
Equipment Characteristics of
Interactive Video Technology 7
Practical and Descriptive Studies 8
Research Summaries 14
Effective Distance Teaching Skills 14
Media Selection 16
Professional Development 17
Learning from the Medium 18
CONTEXT OF THE STUDY 19
The School Division 19
The Schools 20
The Class 22
The Teacher and Student Participants 23
The Students in the Sending Classroom 23
THE CASE STUDY 24
The Cast of Characters 24
Katherine 25
Joanne 26

Yvette 28
Melanie 29
Valarie 30
Mr. Callum 32
The Case Study 33
Administrative Concerns 33
Full Timetables 34
Administrators as PictureTel Teachers 35
Administrative Cooperation 35
Student Numbers in Respective Classrooms 36
Scheduling Problems 37
Interruptions 37
Examination Supervision 38
Teaching Concerns 38
Class Format 41
Advantages of Class Format 41
Disadvantages of Class Format 42
Pace of Class 43
Advance Preparation of Students 44
Technical Consideration 45
Classroom Arrangement and Set-up 45
Camera and Picture Quality 46
Blackouts 48
Camera Control 48
Sound Quality 48
Personal Appearance 51
Keypad 52
Teacher Expectations 53
Student Approaches to Learning 55
Student/Teacher Dynamics 57

Student Interaction 60
Off-task Behavior 63
Seating Plans 64
Discipline 65
Immediacy 66
Adult Presence 67
Teacher Questioning 68
Examinations 69
Report Cards 70
Parent-Teacher Interview 71
REFLECTIONS AND SUGGESTIONS. 71
Reflections 71
Technology 71
Interpersonal Interaction 73
Teacher Presence 73
Teacher Affectiveness 73
Teacher Expectations 74
Discipline 74
Teacher Strategies 74
Teacher/Student Dialogue 75
Teacher Questioning 75
Student Interaction 75
Facilitators 76
Additional Demands on Participants 76
Student Views 76
Teacher Views 77
Staff Inservice and Monitoring 77
Summary of Reflections 78
Suggestions to Participants 79
Technology 79

Interpersonal Communication 80
Additional Demands on Participants 80
Suggestions for Further Research 81
REFERENCES 82

APPENDIX

Diagrams of Sending and Receiving Classrooms 85

Distance Education Technology and the Teaching-Learning Process in a Rural High School: a Case Study

INTRODUCTION

Traditional solutions for Saskatchewan rural school depopulation have included the consolidation of schools and busing students longer distances to these larger schools or organizational strategies such as multi-grading or phasing certain courses. At some point, however, the distances become too long or the school too small for these alternatives to remain viable. Nevertheless, the picture is not entirely bleak. Perhaps the brightest shining light for small rural Saskatchewan schools is the application of distance education technology.

Background for the Study

Distance education is "the organizational framework and process of providing instruction at a distance. Distance education takes place when a teacher and student(s) are physically separated, and technology ... [is] used to bridge the instruction gap" (Willis, 1992, p. 104). This type of communication can occur through a variety of technical media including print, computer, fax, telephone, audiocassette, videocassette, broadcast television, and narrowcast interactive television (Report of the Minister's Advisory Committee on K-12 Distance Education, 1992, p. ix). Some types attempt to replicate the experience of face-to-face instruction--the teacher teaches "live" and interacts with students because "this interaction is considered a critical incident in recreating traditional instruction" (Cabrara, 1992, p. 252).

Presently, interactive video is one of the newer mediums of distance education. Within this field, fibre optic links, and the improved ability to compress video signals, have allowed for the delivery of a fast, high quality signal which is easily expanded to many sites. On the down-side, there are high start-up costs, although these are recovered over time.

One Saskatchewan rural school division, called here Wheatbelt School Division, is presently using compressed video and PictureTel system:

> PictureTel works by transmitting compressed video signals over two regular phone lines. The system takes the signal from a video camera, digitizes and compresses it through a decoder, called a picture processor and transmits it to the receiving decoder and broadcasts the signal on a

> T.V. monitor. The picture processor, monitor, and camera are all contained in a single PictureTel unit which is placed in each classroom. The system is remotely controlled by the students in the receiving class or the teacher. (Gunningham, 1992, p. v)

This school division has four K-12 schools and all but one face problems with declining enrollments. As a result, there is a limit to the number of high school credits that can be offered. Two high schools have been using the PictureTel system since 1991 and in the fall of 1993, a third one joined the system. As mentioned previously, the start-up costs are high at approximately $60,000 for hardware and $3,000 in software per site. Recurring costs of long-distance charges are approximately $1,500 per class. However, "the more the system is used, the greater the cost effectiveness" (Gunningham, 1992, p. ix).

Wheatbelt School Division chose the PictureTel delivery system because it emphasized localness, simplicity and personal interaction. There are no course developmental costs because each teacher uses the provincial curriculum and materials as in any regular class. There are no permanent on-site technical support staff as is the case at several other distance education sites within the province.

The notion of localness is an issue in distance education. A similar project in the Oklahoma Panhandle called the Panhandle Shar-Ed Video Institutional Network "offers a way to expand resources for the districts yet maintain local control of curriculum, assure high-quality instruction and keep the local school/community identity intact" (Cabrara, p. 264). The Wheatbelt School Division also feels the need to control the technology "so that the most skilled teachers can be utilized and curriculum can be adapted to local needs" (Gunningham, 1992, p. iv).

Need for the Study

The Wheatbelt School Division's compressed video program is intended to facilitate teacher-student interaction. The need to provide for interaction appears in a number of other distance education projects, some of which will be discussed later, but too often it seems educational planners give more attention to the delivery system than to the learners. It is time to pay more attention to the teaching-learning process in such

multiple settings. Specifically, educational researchers need to study the dynamics of learning when the process is channelled through a technology like PictureTel.

To date, I have found no specific naturalistic case study that examines the teaching-learning process using compressed video technology.

Purpose of the Study

The purpose of this study was to understand more completely the way a teacher teaches and learners learn in a distance education classroom. To achieve this purpose in my study, I explored the types of teaching/learning strategies used by participants and their reaction to this experience.

The Focus

The teacher and the students at the receiving site were the focus of this study. Through observation and in-depth interview, I explored the following questions:

1. How do students in the receiving classroom of a distance education project using compressed video technology approach learning and what are their views about learning?

2. How does the teacher in the sending classroom of such a project approach teaching and what are his/her views about teaching?

Definitions

For the purpose of this study, the following terms are defined:

Bridge

A device for interconnecting communication devices such as telephones so that individuals can hold a teleconference (adapted from Schwier, Brown, Misanchuk, & Proctor, 1992, p. 80).

Compressed video

Reduces the bandwidth necessary to transmit video images over communication channels. Often only the changes between successive video are transmitted (Schwier, Brown, Misanchuk, & Proctor, 1992, p. 80).

Immediacy

Consists of verbal and nonverbal acts which enhance closeness and interaction with others (Hackman & Walker, 1990, p. 7).

Interactive

If there is two-way audio and video transmission, this may help to alleviate the student's sensation of isolation and may help remove motivational barriers (adapted from Tompkins, 1992-93, p. 266).

K-12

Kindergarten through grade 12. Many rural schools in Saskatchewan encompass all these grades even though their student population is small.

Localness

Having local control for the purpose of expanding local resources, curriculum or instruction to keep the local school/community identity intact (adapted from Cabrara, 1992, p. 264).

Off-task behavior

Student is not doing what is expected of him/her in the teaching/learning process. The behaviors that can be called off-task are dependent on what expectations has been specified by the teacher for on-task behavior.

PictureTel

Type of compressed video network chosen by the Wheatbelt School Division. Some other systems are Compression Labs, Videotelecom, and Full Motion.

Point-to-point

A connection permanently established between two specific stations, each site can originate and receive messages (adapted from Schwier, Brown, Misanchuk, & Proctor, 1992, p. 90).

Receiving classroom

The site which is physically distant from the instructing teacher.

Sending (transmitting) classroom

The site in which the teacher is physically present.

Withitness

Teacher awareness of classroom phenomena and classroom interactions that have an influence on the teaching-learning situation (from Kounin, 1970).

METHODOLOGY

During the months of September and October, 1993, I observed and participated, to a limited degree, in a Law 30 class in two K-12 schools in the Wheatbelt School Division. In this naturalistic study, I observed in the receiving classroom for two weeks, then observed in the transmitting classroom for one week, followed by another cycle, and finished with an additional week of observation in the receiving classroom. The end of my final week of observation coincided with the end of the first term of the Law 30 course. Observing the class from opening day to the end of the first cycle of evaluation (excluding the rewrite exam) I was able to acquire the information needed to describe the situational context of these non-traditional classroom settings.

Six of the nine students at the receiving site agreed to participate in interviews which focused on their approaches to learning and their views about learning in the receiving classroom of a distance education project using compressed video technology. All six students were interviewed after two Law 30 class periods in early September. One of these six students dropped out of school just before the second set of interviews. The remaining five students were interviewed in early October, mid-way through the observation cycle, and again in early November, following the end of my observations. All participants were interviewed separately each time. The three students who were not interviewed were willing to be included in any observation comments I might make about the general demeanour of the class.

The participating Law 30 teacher was also interviewed three times during this study. The first interview, held after the opening day class, focused on how he planned to approach teaching and his views about teaching in the sending classroom, as well as a discussion of the background to this distance education project. The second and third interviews, held in early October and early November, respectively, allowed the teacher to reflect on his teaching and his views of teaching Law 30 from the sending classroom. The interviews with both students and teachers generated many of the themes that emerged in data analysis.

Standards for conducting research established by the University of Saskatchewan were strictly adhered to during this study. All participants were informed of the nature

of the research and their rights as participants. All participants in this study voluntarily consented to take part in the study.

Before the study began, access to the school-sites, teacher, and the students was granted by the Wheatbelt School Division and by the principals at the school sites. The teacher was informed of his rights as a participant and signed an informed consent release. A pseudonym is used in place of the teacher's actual name.

All students in the class and their parents were informed of their right to refuse to take part in the survey of the class and that any results would remain confidential. Student participants and their parents were informed of their rights to withdraw from the study at any time and that their identities would remain confidential. Student participants and their parents signed informed consent release. Pseudonyms are used in the thesis in place of the actual students' names. All participants were provided with the opportunity to read transcripts of interviews to ensure their accuracy and signed transcript release forms. As well, the teacher read over copies of the observation notes and then signed a release form.

Documents were a third source of data. These included student assignments, exams, student binders, the school division's quarterly distance education evaluations, and field notes on changes made to the PictureTel system.

Since this was a naturalistic study, the general guidelines outlined in Lincoln and Guba's (1985) Naturalistic Inquiry were followed. Merriam's (1988) Case Study Research in Education provided me with more specific directions on conducting case study research. Merriam states that case studies are useful in presenting basic information in areas of education where little research has been conducted. Classes taught using compressed video technology would certainly fall into this category. A fairly recent publication by Glesne and Peshkin (1992) was invaluable in providing many ideas for me to examine my mindset and interaction with others, as a naturalistic researcher.

Researcher coding categories were developed to organize the data. Bodgen and Bilken (1982) were the main source of ideas for methods of coding and procedures that a researcher might use to handle the quantity of data typically gathered in a qualitative study (p. 156-168). I decided to use a topical coding system rather than a thematic one

because, even though themes definitely emerged from my data, many descriptive details did not fall neatly under one of these themes, but were still important to the context of the study.

The coding scheme I developed eventually included the type of data (field notes-F, interviews-I, observation notes-O, documents-D), date, page, speaker or subject and topic (numbered alphabetically) and possibly sub-topic (small letters). For example, the code I, Sept. 12, p. 5, J, 44 refers to page 5 of the interview transcript from September 12, with Joanne regarding her comments on the PictureTel technology. All pages were then coded, copies, clipped and then sorted into topical file folders and ordered by date.

A REVIEW OF THE LITERATURE

Equipment Characteristics of Interactive Video Technology

Before considering the teaching and learning process using interactive video technology or other similar technologies, I have provided a look at the specific characteristics of this technology, as well as research discussing the strengths and weaknesses of the PictureTel system.

The Kansas State Department of Education (1989) highlights some of the "ideal" characteristics of an interactive video classroom:

> The key concept in an interactive video classroom system is maximum **interactivity** ... Fibre-optic cable transmission provides the capability for a classroom to actually be extended to different locations without losing the interaction between students and the teacher or among the students in one classroom and the students in other classrooms. The instructor can see all of the classrooms and students concurrently. Students can ask questions of the teacher at any time during the class period. When the teacher responds to the questions, all students can see and hear both the student asking the question and the teacher answering it. A teacher can ask a question and see all of the students before indicating which student should respond. All other students can see both the respondent and the teacher answering the questions.
>
> A very important factor in the process of teaching and learning is the teacher's ability to determine if students are understanding the concepts or ideas presented. In order for this analysis to occur, it is imperative that the teacher be able to see the students' expressions and reactions. Without

> visual observation this process is extremely difficult to accomplish. Fibre-optic communications systems easily provide for two-way audio and visual communication. (p. 8)

However, the question to consider is does interactivity happen in practice? Many of the descriptive studies that follow suggest it does not.

One advantage of interactive television is local control in which schools determine the curriculum and schedules to be followed; they do not have to wait for satellite schedules. Local teachers are used for instruction and the local schools can share their best teachers.

Baird (1991) describes technical comparisons made of three compressed video systems: Compression Labs, Videotelecom, and PictureTel for the Wyoming Center for Teaching and Learning Network. Only the strengths and weaknesses of PictureTel will be described here because my research focused on a course being taught using this technology.

Baird (1991) describes PictureTel as having the best overall picture and sound quality of the three systems. The picture-in-picture feature using only one monitor, easy upgradability of the system and ease of use of the control panel (keypad) are also seen as strengths.

A major weakness is the incorporation of a infrared remote control panel which is attached by a wire to the system, greatly restricting movement for presenters and the person operating the system. Not having a built-in computer also hampers the flexibility of the system to capture, save and retrieve data or graphics.

Practical and Descriptive Studies

Tompkins (1992) describes three ongoing distance learning projects using fibre optic technology in the United States: the Minnesota Department of Education project, Oklahoma Panhandle project, and the Mississippi 2000 project. In the Minnesota project, educators found that interactive television was useful in teaching science, social studies, fine arts, mathematics, language arts, business, and vocational education. The Panhandle Project uses a Full Motion interactive video system, a more sophisticated system than PictureTel's "quiet" picture. Members of the business community, educational community and the state government have combined to address the problems of rural education, choosing not to use

satellite transmission because the school district wants local control over transmission and curriculum content. This system is used to teach similar courses as in Minnesota. Mississippi has also chosen to adopt a fibre optic system to overcome problems of isolation and attracting and retaining qualified educators in rural areas.

The Minnesota system uses student registrations to determine which courses are actually taught. Courses that tend to work best are elective courses. Required core courses have not been offered on this system. "In all cases, student registration for interactive television classes is voluntary" (Minnesota State Department of Education, 1990, p. 12). Like the Minnesota system, Share-Ed makes program decisions based on course demand and student intent.

Experience of the Minnesota system has also proven that interactive television is not appropriate for all students or teachers. Students taking the courses tend to be self-motivated and truly interested in the course material. Classes and teachers that use a high level of interactivity tend to work best.

Barker (1989) describes the Oklahoma Panhandle Shar-Ed Video Network in detail. Unlike the Wheatbelt PictureTel system, which has only two cameras, Shar-Ed has three:

> An overhead camera can zoom in, much like an overhead projector, on materials the teacher might want to display on the T.V. screen. A second camera can focus directly on the teacher for lecture or discussion. A third camera focuses on the students. At each site, the teacher is able to switch from one camera to another. At the host site, if the teacher wishes to step down from the lecture area to work individually with students, she can simply switch to the camera that focuses on the students, then walk down among her "live" class. (p. 9)

Selection of teachers for Shar-Ed was determined by the superintendent and principal of each school. The four teachers selected to teach courses during the first year of operation have essentially learned on their own how to teach over the system. Although an orientation to the equipment and system was provided, no formal training was conducted. During interviews, teachers indicated that effective teaching via two-way T.V. requires more thorough preparation on the part of the teacher. Principals also allowed one additional preparation period for those teachers teaching over the network. When asked to describe how a tele-class was different from a traditional class, many teachers indicated that beside

the need for better preparation, the teacher's classroom mobility was restricted because of the camera range.

Shar-Ed also differed from the Wheatbelt system in the use of classroom facilitators.

> At sites receiving T.V. instruction, a classroom facilitator has been appointed by the school principal to serve as a proctor during the lesson broadcast. In three of the four schools, certified teachers in non-related subject areas, with part time teaching loads, were assigned to proctor T.V. classes. At one school, an aide served as a proctor. No job description has been written for proctors yet, but their basic chores are to be present in the classroom to operate the fax machine, adjust equipment, distribute materials, and help make sure that the students are kept on task. (p. 18)

McCleary and Egan (1989), in their study of two-way interactive television, also address the issue of using facilitators.

> Greater use was made of the facilitators in serving as a part of the instructional team, rather than just managing the physical and technical aspects of the course. Limited training was provided to those facilitators to assist them in conveying feedback to students and to provide assistance in student projects. (p. 59)

Shar-Ed (Barker, 1989) is also prepared for potential discipline problems in the tele-classes.

> Upon enrolling in a T.V. course, students and their parents/guardians are presented a list of student behavior policies which both are required to sign. Students agree that they will sit within the camera view area at all times, they will not mishandle equipment, and they will obey all rules specified by the T.V. teacher. They agree not to use inappropriate language or gestures and are informed that the T.V. teacher can videotape their behavior, if desired, without their knowledge. Students who violate the stated rules are given one verbal warning and told that their parents and the building principal will be notified by written letter of the infraction. If there is a second offense, students are removed from the class. (pp. 18-19).

Principals have also worked out a common bell schedule among all schools to eliminate scheduling problems (p. 19). This approach has also been used by the Wheatbelt School Division.

Shar-Ed teachers report that the novelty of this kind of class quickly wore off with students. One teacher states that "On a more personal level I see these kids [T.V. students]

becoming more familiar with other kids in the country. [I]n the community, we have kids making dates over the T.V." (pp. 20-21).

In the future, Shar-Ed plans to switch from a point-to-point network to a switched (bridge) network (Currer, 1991). Although a switched network is initially more expensive to install, over time it is more economical and much more versatile. Without a bridge, only a one-on-one relationship exists between schools. Two schools cannot receive from the sending school at the same time. Whereas with the switched system, "the entire network can participate in any one class" (p. 17). The Mississippi 2000 distance learning project uses a switched Full Motion network.

Kansas State Department of Education (August, 1989) uses a system consisting of two-way audio and one-way video. It reports that:

> Classes in each of the schools are small (less than ten students) so an extensive amount of interaction is expected. If students need additional help, the same classroom can be used for individual tutoring before or after school. Homework and tests are faxed over the fibre-optic cable to the teacher. Assignments are sent to the students with the same technology. Several times each semester, all of the students and the teacher get together at one location for discussions and socializing. (p. 9)

These organizational coping strategies are reflected in some other research report recommendations.

Dillon, Hengst, and Zoller (1991) report on an investigation of instructional strategies used, the barriers to interaction, and the impact of technology upon the selection of strategies in the Oklahoma Televised Instruction System (TIS). TIS is a live interactive system that provides two-way audio and one-way video communications between students and instructor.

The researchers suggest that the nature of student involvement in the learning process is especially important to the practice of distance education.

> The instructor-centred strategies include the following: lecture, directed questioning, and demonstration. These strategies are efficient methods for learning within the knowledge and comprehension levels of the cognitive domain and the receiving level of the affective domain.
>
> The interactive strategies include the following: class discussion, discussion groups, group projects, and peer teaching. Because these methods

> utilize communication among students and between students and teacher, these strategies are effective for learning within the upper levels of the cognitive domain including analysis, synthesis, and evaluation and for learning within all levels of the affective domain. (p. 33)

Strengths of the system include the ability for interaction between the distance and traditional students and the ability to videotape a lecture for playback at student convenience. Besides technical breakdowns and the lack of face-to-face contact, the major weaknesses reported were:

> The requirement of a more structured presentation, the inability to plan "pop" quizzes ... weak on-campus support staff, inadequate preparation by the distance students, and an inadequate proctoring at the distance sites ... poor audio quality, fixed cameras and fixed seating. (pp. 37-38)

Dillon et al. (1991) report that the faculty received little training for interactive television and most of their training was acquired informally from more experienced faculty members. As well, most faculty would not choose to participate again, if given a choice (p. 39).

Hansford and Baker (1990) evaluated a two-week interactive video teaching trial. "Two aspects of the trial were of particular concern: perceived adequacy of the physical presentation of sessions when using compressed data at two transmission speeds; and students and staff perceptions of the acceptability of instructional processes and communication" (p. 288).

In contrast to face-to-face teaching, a member of the staff had difficulty in "reading such non-verbal cues as facial expressions and making eye contact. Staff members felt this made it difficult to assess student reaction, thereby affecting the flow and pace of instructional sessions" (p. 299). Staff were also critical of the positioning of microphones and reported that their voices echoed occasionally, which they found distracting. They also criticized the restriction of movement because of "cumbersome" furniture. Staff received no preparatory training or advice and they stressed the need for advice for teaching using interactive video technology (p. 300).

Hansford and Baker (1990) found that half the students felt that they had learned about as much from interactive video sessions, compared with traditional teaching, while

over 40% felt they had learned less (p. 302). In their conclusions, the researchers suggest that the type of technology used is not integral, but may be mediated by other factors which affect student and staff perceptions of the effectiveness of a delivery system (pp. 303-304).

Kirby and Chugh (1992) constructed and administered a Q-Sort instrument to a sample of instructors who had used audio-teleconferencing at the post-secondary level. Like Hansford and Baker (1990), the researchers noted the loss of feedback from non-verbal cues. As a result, the researchers proposed that instructional strategies are to some degree determined by the instructors' perceptions of instructional environment:

> Although it is generally acknowledged that mediated instruction results in a reduction in the quality of interaction present in face-to-face communication, for example in audio-teleconferencing, there is a loss of feedback from non-verbal cues, it might change the nature of the instructional transaction in more subtle ways .... [I]t may well be that this is the most identifiable characteristic. (pp. 35-36)

Barker and Patrick (1988) observed 15 hours of three courses (Computer Science I, Art History I, and Sociology I) on the TI-IN Network, a satellite system, to analyze various teaching techniques. They found that 90 percent of the dialogue in the three classes was carried out by individual teachers and 10 percent by the students (p. 7). They also analyzed "wait time" or how long the instructors waited for a response before either answering their own question, restating the questions, or providing cues to students (p. 9). The level of questioning, the use of advance organizers, and teacher statements of expectations for students, review, praise and corrective feedback were also studied. Although the researchers found that such teaching behaviors occurred to the same extent that they occur in a traditional classroom, they suggested that further research should focus on effectiveness of programs using satellite networks.

Chung (1991) reported on two case studies conducted at Indiana University's School of Health, Physical Education and Recreation. In the second case study, nine behaviors or skills were considered "important or essential" by 100% of student respondents in a survey on characteristics of excellent television instructors. Those behaviors and skills included:

> Clarifying material that needed elaboration, answering questions clearly and concisely, summarizing one topic before moving on to a new topic, designing evaluation procedures that are consistent with course objectives,

> maintaining an atmosphere which actively encourages learning, willingness to explore a variety of points of view, demonstrating enthusiasm in the course, providing feedback in a timely fashion, and distributing course materials in a timely fashion. (pp. 45-46)

The last survey item was an open-ended question asking students what makes television instruction effective. "Most respondents commented on the ease and quality of the technology used during the course" and "that the success of a telecourse is dependent on the quality of the instructor" (p. 46).

Three telecourse instructors were asked to identify critical skills or behaviors needed for teleteaching. Aside from effective traditional classroom teaching skills, all agreed that extra preparation was essential and a presentation style which includes being animated, humorous, dynamic, articulate and moving around was important (p. 46).

To conclude this section, comparative analysis of practical and descriptive literature can be used to isolate similar characteristics that have been described in different contexts.

Research Summaries

Reviews of findings from the field often present summaries of various strengths and weaknesses of distance education media, methodology, and process.

Moore and Thompson (1990) present a comprehensive research summary exploring various components of the distance learning process. Willis (1992) draws on their article to describe what factors enhance the effectiveness of distance learning.

Moore and Thompson (1990) include the findings of a survey conducted by Barker in his survey of TI-IN students which found:

> Almost 70 percent of the students indicated that they would choose a traditionally unstructured course over a satellite course. The main weakness reported by students included the amount of work, difficulty in hearing, difficulty in contacting the teacher, and inadequate teacher preparation and training .... [S]tudents recommended that the quality of the audio be improved, that larger monitors be installed and that the reception equipment be left in good repair. (p. 14)

Effective Distance Teaching Skills

Moore and Thompson (1990) say the literature reflects general agreement on what are effective teaching skills, beneficial in a traditional classroom, but essential in distance

teaching (p. 16). Summarizing others, they suggest these skills included:

- Be prompt in coming on line and insist students do the same.
- Use a natural style of delivery; speak slowly and enunciate clearly.
- Maintain spontaneity, avoid reading as if from a script.
- Use visuals effectively.
- Use frequent changes of pace to maintain interest.
- Frequently draw participants into discussions.
- Always refer to participants by name.
- Give short concluding summaries of the concepts presented.
- Provide structure by effectively using authority.
- Control verbal traffic.
- Provide socio-emotional support by integrating late group members and encouraging humor.
- Establish a democratic atmosphere by sharing authority and asking for participation.
- Create a sense of shared space and history.
- Model appropriate behavior.
- Seek and clarify a common definition of terms.
- Set an appropriate pace. (Moore & Thompson, 1990, pp. 16-17)

Willis (1992, pp. 27-28) provided a similar summary.

Wilson (1990) describes a college-level, satellite project using one-way video and two-way audio. He notes that the teacher rarely initiated contact with students; students usually initiated contact during a given time in the class period.

Citing the work of Clark, Wilson reports from a study which describes the characteristics of teachers that high school seniors feel help them learn:

> Help students in the class, teachers must be understanding, knowledgeable, and fair. However, students rated teachers highest in knowledgeability and lower in fairness and understanding. These students also commented that teachers were more demanding and strict than they needed to be and less interesting and creative than students would like. It appears that what teenagers say is important in a teacher are intangible personal characteristics. This proposes the question to what extent will student needs be met through the use of the medium of distance education. (p. 13)

Willis' summary of the research (1992, pp. 24-25) also mentions the aspect of "affectiveness" in distance learning. He concludes that distance education "can be equally effective if the distance educator puts adequate preparation into understanding the needs of the student and adapting the instruction accordingly" (p. 21).

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Media Selection

Moore and Thompson (1990), citing the work of Dutton and Lievrouw which indicates that the issue of media selection "must be content-driven rather than technology-driven" that, considerations of instructional content, the need for involvement, and the particular learning outcomes desired should provide the primary basis for technology choices (p. 113). A similar concern, particularly as it relates to teleconferencing, suggests that this medium has unique transmission characteristics for four modes of teleconferenced delivery:

> Audio-conferencing (good for discussions of abstract concepts); audiographic teleconferencing (combination of verbal messages and visual materials provides both abstract and concrete learning experience); videoteleconferencing (permits audio and visual interaction, thereby enhancing learner 'satisfaction'), and computer conferencing (allows convenient transmission of text and graphics). (Moore & Thompson, 1990, pp. 20-21)

Moore and Thompson (1990) conclude their discussion of media selection and usage by suggesting the importance of non-electronic mediums such as print and tape recordings which students can use in their own time and under their control. They suggest:

> Many learning needs that are currently the subject of very expensive media can probably be met by less expensive, less glamorous media. The power of print, recording, and the telephone should never be underestimated. Numerous research questions need to be asked concerning the ways in which media are selected." (p. 39)

Willis (1992), also, maintains that "the content being presented and the capabilities of the delivery system must be complementary" (p. 21).

Bauer and Rezabek (1992) present various implications and recommendations after researching two-way visual contact on student verbal interactions. The results of the study indicated "that students were not likely to interact more during teleconferenced instruction where students had two-way audio and video contact with the instructor than they would during teleconferenced instruction where students had only two-way audio contact with the instructor" (p. 23). As a result, they suggest three concerns that should be studied in further research. First, "can nonverbal cues that induce interaction be transmitted via television?"

(p. 23). Secondly, "further research could be conducted to determine whether site visits increase the amount of interaction that occurs during teleconferences that follow the site visits" (p. 24). Finally, "the assumption that the addition of visual contact is in and of itself capable of improving distance education is not substantiated in this study" (p. 24).

Professional Development

Another concern of Moore and Thompson (1990) is the professional development needs of distance educators. Citing Batey and Corwell, they contend that: "Often teachers are left to grapple with the new programs on a 'sink or swim' basis under the assumption that no training is required" (p. 16). Moore and Thompson found that many instructors desire early, appropriate training. Indeed, several studies mentioned in section one of this chapter, support this conclusion (Barker, 1989; Dillon et al., 1991; Chung, 1991; Hansford & Baker, 1990). Many in-service programs seem to be mainly concerned with how to run the equipment and little time is spent on how to incorporate the technology into instruction and organizational strategies. "There is some evidence that the success of distance education in the schools depends largely on the effectiveness of the teacher, and that this in turn depends on the teacher's knowledge, skills, enthusiasm, and commitment to innovation" (Moore and Thompson, 1990, p. 37) and therefore the need for and the quality of teacher training cannot be undervalued. "Research suggests that effective distance learning is more the result of preparation than innovation" (Willis, 1992, p. 21).

LaFollette (1992) also notes "the persistent finding that where significant outcomes favored a technological delivery system, highly effective planning took place" (p. 110). However, while research suggests that teacher education is one of the most important elements of implementing educational technology, specific school system inservice often faces obstacles that prevent utilization (p. 114).

One hypothesis proposed in the literature "is that success depends on the extent to which there is a transfer in the motivation for the project from that of external funding to internal commitment by the teachers " (Moore & Thompson, 1990, p. 40).

Dede (1990) and Hackman and Walker (April, 1990) refer to the need for distance teachers or instructors to create "an intellectually and emotionally attractive 'telepresence'" (Dede, 1990, p. 253) or "social presence" (Hackman & Walker, 1990, p. 7). The reasons

for this include:

> 1. Information technologies are predominately a visual medium, rather than the textual and auditory environment of the conventional classroom.
> 2. The affective content of technology-mediated messages is muted compared to face-to-face interaction. (Dede, 1990, pp. 258-259)

In general, Hackman and Walker (1990) found "instructors engaging in behaviors which minimized psychological distance between themselves and off-campus students were rated as most effective" (p. 7). Any behaviors that encouraged and established a connection between teacher and classroom were useful.

Learning from the Medium

Kozma (1986) summarizes the findings of various comparative studies of televised instruction and states that:

> The fruitlessness of most of this research stems from failure to ... make a distinction between 'the medium' and 'learning from the medium' .... [I]t matters less that television is a temporarily fixed sequence of audio and visual information than how sound is used, how motion is used, how the message is organized, etc., and how this corresponds to the learning process. A focus on the psychological effect (original emphasis) of the production rather than on the medium itself is more likely to result in useful research. (p. 14)

Kozma (1986) proceeds to address the research on several aspects of learning from television. Pacing is one concern - the amount and rate of information presentation which can be accommodated by short-term memory. Research seems to suggest objectives of the program should be limited and information should be presented on each objective in a different format (p. 14).

Cuing is another concern. Kozma (1986) highlights some useful strategies for increasing attention and comprehension. "By providing verbal overviews, giving instructional objectives and other advance organizers, ... the message can aid the viewer in sifting through information for that which is most relevant to the learning at hand" (p. 15). Formal features of the presentation, and reminders to the learner that certain tasks require more of an investment of mental effort are other cuing strategies (p. 15).

Norenburg and Lundblad (1987) present a general review of distance education.

They highlight several concerns relevant to instruction using interactive video. "Learner autonomy and the degree of control exerted over the learning situations by the learner have important ramifications and require many modifications" (p. 13). First, "great care must be taken to avoid student misunderstanding at the beginning and throughout the course .... [S]econdly, since course requirements and instructor expectations in the conventional setting are often conveyed informally ... it is important that requirements be presented in a detailed up-front manner with distance education" (p. 14). This is to acknowledge the loss of teacher immediacy in the distance education process and as a result the teacher must compensate in some way.

CONTEXT OF THE STUDY

To better understand the findings of this study, the reader will find it helpful to know something about the context of this study: the school division, the schools involved, the Law 30 course, the teacher and his students.

The School Division

The Wheatbelt School Division has four K-12 schools serving the needs of about 1100 students. In the 1990-1991 school year, the director of education set up the Educational Program Committee made up of central board members, administrators, teachers, and local board members with the purpose of looking at the entire programming within the division and possible solutions for the problems associated with the increasing sparsity of population but bigger demands on the educational system. A survey of parents, students, and teachers indicated that, if anything, parents wanted more in terms of core credit variety and electives and they preferred that this not be accomplished through the use of itinerant teachers. The committee asked the director to look at all types of distance education technology as a possible solution to expanding the number and types of programs offered. He was able to arrange with a provincial crown corporation, a pilot project to try out the PictureTel system, a compressed video technology.

In the fall of 1991, Hillview School and one other school in the division began to offer courses to each other over this system. Initially, Calculus 30 was sent to Hillview School while it, in turn, sent Geo-trigonometry 30 to the other school. A common day had

been adopted by all schools in the division which meant that all schools had the same number of class periods, at the same time, each day. As well, all the schools had a common schedule for reporting periods and parent-teacher interview days. The pilot project was extended to the end of the 1991/1992 school year and adopted as one means of program delivery for the next school year. The number of courses being offered over the system grew to include a number of senior mathematics classes, several French classes and a number of elective courses such as Law 30 or Family Life 30.

At the beginning of the 1993/1994 school year, the school division also adopted a new policy that all students in grades 10, 11, and 12 were required to have a full time-table; they were not allowed to have any spares in their daily schedule. This decision meant that students now had to enroll in courses that they did not necessarily need but filled up their timetable. If a student chose not to take a course offered in the school, either through the PictureTel system or by traditional means, they had to take a correspondence course to fill out their time-table. Several of the schools like Hillview had already adopted this policy at the local level before it became division policy, but Durham School had allowed their senior students to have spare periods up until the beginning of the 1993-1994 school year.

The Schools

Durham School, the receiving school, was set in the midst of a predominately farming community. The students are a mix of village and farm children, some of whom are bussed long distances. The student population of the school was less than two hundred students and some grades were combined in multi-grade classrooms. For example, the grade 11 and 12 classes had been combined for many subjects since the fall of 1991.

A new principal had been hired for the 1993/1994 school year after the previous principal retired. Mr. Bill Green, an experienced PictureTel teacher, had taught at Hillview School prior to assuming the principalship at Durham. As a result, Mr. Green and Mr. Callum, the Hillview principal, knew each other well from working together on the same staff.

During the 1993/1994 school year, Durham School was receiving French 10, Algebra 30, and Law 30 and sending Geo-Trigonometry 30 and Psychology 20 over the PictureTel system. Durham School had just been equipped with the PictureTel system over

the summer months.

When an observer spends time at a site, I think it is possible to gain, over time, some sense of the place and the people who occupy it. One of the first things that would strike a visitor to Durham School as they walk down the high-school hallway is the scarcity of students. The halls are typical of a building which was built in 1950's, clean and well-maintained but worn and perhaps, past its prime. However, anything technological such as office equipment, the computer lab, besides the PictureTel equipment, was relatively new. The students were friendly but watchful of new-comers including the new principal, Mr. Green. Whenever he responded to a student or to rough-housing incidents as he walked down the hallway, the other students carefully watched how he reacted.

The PictureTel classroom was like all the classrooms in that wing of the building; it was a large spacious room with high ceilings, old blackboards and a tiled floor. Along one wall there were two windows, one at each end. The two PictureTel monitors and unit had been placed in a corner on the upper left side. Desk arrangement varied somewhat from day to day, but generally the desk configuration was wedge-shaped, with the desks angled across the room facing the monitors directly. The Appendix includes a diagram of the classroom. The classroom was located about half way down the high-school hall and although the teachers sometimes commented that its location was in a noisy area, I did not find this was so.

Hillview School, the sending site, was located about 60 miles away, in a largely farming and ranching area. The community had a reputation as being a lively, civicly-minded and successful place. The school itself was of similar age to Durham, but it had undergone major renovations in the late 1980's. The school had a feeling of airiness and brightness even though the hallways in places were narrower than in the other school. The student body moved briskly through the hallways during the class change breaks. The K-12 population of the school was 220 students and even with small difference in number of students when compared to Durham School, there was certainly a sense of more people being around.

The PictureTel classroom was located at the very north end of the school building. The room was medium-sized for a classroom, with carpet on the floor, whiteboards instead

of blackboards. The PictureTel unit and single monitor stood along the west wall between two long narrow windows. Tables were used instead of desks and these were placed in a horse-shoe shaped arrangement at the east side of the room. This classroom and the industrial arts room across the hallway had been remodelled from the school's old gymnasium. Perhaps, its location near this other activity area presented its biggest drawback because sometimes the noise from the saws and planer could be heard in the Durham classroom.

The Class

Law 30 is a full credit course and is intended to provide a general understanding of the law in Canada. The course should also make students aware of their rights and responsibilities as Canadian citizens. My observations took place during the first unit, Understanding Our Legal System and part of the second unit, Rights and Freedoms. Class participation in discussions, written and oral assignments as well as exams were the basis of student evaluation. Students were given two text books on opening day. Several speakers and field trips to court were planned for the year; on October 13 we had a local R.C.M.P. officer from Hillview come into the receiving classroom.

Aside from the assigned readings that the students were given from time to time, a major assignment in the first term was the news article exercise. Each presenter had to find a current news article relating to some situation that had legal ramifications. Then the student had to decide how the law would apply and if the Charter of Rights and Freedoms had any particular relevance to it. Each student provided a written opinion to hand into the teacher besides making an oral presentation lasting at least five minutes. At that point, the other students were expected to discuss the article and ask the presenter questions. The assignment was to be written neatly in black ink or typed so that the faxed copy would be fairly clear. The oral and written components were each worth ten marks and student research and effort should be evident.

Students were expected to complete any assigned readings before class and to note any points they did not understand so that these concerns could be discussed and clarified in class. Mr. Callum suggested that student each make their own notes as he did not plan to give formal notes. Quizzes based on application of student knowledge to various legal

case studies were given from time to time.

The teacher planned to visit the receiving site several times during the school year. Indeed, during my observations, Mr. Callum made two visits to the receiving classroom - September 8 and October 13. The Durham class was also brought to Hillview on September 1 to be part of the same opening day class as the sending students. Mr. Callum's expectations for student behavior included no rudeness, a good work ethic, and "you treat me fairly, I'll treat you fairly" approach (O, Sept. 1, p. 4). He also mentioned the school division policy that required all assignments to be completed before a student could write a final exam.

All marked assignments and exams were sent back and forth through teachers or administrative personnel travelling between schools, rather than using the facsimile. As Mr. Callum reported, faxing written work was:

> ... a pain because if they [the students] didn't write clearly the fax wouldn't pick it up ... you were spending a lot of money on faxing things and there's always people going from the board office to Hillview or from Durham to [third PictureTel school] and it makes more sense to have someone who's just passing through to bring stuff to Durham and they'll get it down to me and that's the way we'll get it back. It's more convenient and also for cost ... but some of the things the kids can do, when they do the little report on these articles, they need to write them up in black ink because it worked better in the fax but I'd appreciate if they type or use the word processor or then just have [the secretary] make a photocopy of their assignment, fax it through and that's do-able, but it's when you get into the hassle of faxing volumes of things because it just doesn't, it's not productive time and costs money. (I, Sept. 2, p. 15 T/R)

On days when the teacher was absent, assignments were faxed to the receiving school but the PictureTel system was not used.

The Teacher and Student Participants

Mr. Callum and the student participants will be described in the first section called "The Cast of Characters" of the case study.

The Students in the Sending Classroom

The Law 30 students at Hillview School were generally a quiet group, although the

two boys talked to each other a lot and to Mr. Callum. The three girls were extremely quiet and basically did not talk unless they were asked a question. Later on, one of the girls dropped the class to take a correspondence course. Mr. Callum described the class as average to low average in academic ability. One boy was a lively individual who seemed to have a fair amount of first hand experience with the legal system, at least when it came to a variety of traffic violations.

They were pleasant toward me and I thought natural in their behavior. I mentioned this to the teacher one day and he replied that they were accustomed to being observed because there were often visitors from other school divisions to observe the system in use. He mentioned that the school had been visited by approximately forty different groups since they had started using PictureTel.

THE CASE STUDY

Because of the qualitative nature of this study, I will report the findings in two parts. First, I will present a brief description of each of the six participants interviewed. To varying degrees, each of the participants articulated or illustrated, in their observed behavior, the issues that emerged from this study. These will be discussed in the second part, the case study itself. During data analysis, I found myself becoming swamped by the detail and losing sight of the story that I observed and was perhaps part of, in some small way, when I was out in the field. Rather than imposing a tightly structured and externally imposed outline, I tried to get back inside the participant's conversations and my observations and to tell the story of teaching and learning in the Hillview/Durham Law 30 class.

The Cast of Characters

Of the nine students in the receiving classroom, six class members volunteered to be interviewed in the study. The remaining three students were quite willing to be included in any observation notes and signed release forms to that effect. During the time I was there, two students dropped out of the class. Cameron left first, switching over to Economics 30 through correspondence. Derek officially withdrew from school in late October even though he had been absent for roughly two weeks before that. All the students were taking at least one other class and often two other classes over the PictureTel

system, although in all the other classes, they were in the sending rather than the receiving classroom. The other subjects offered over the system were Psychology 20 and Geo-Trigonometry 30.

The five interviewed students were the most outgoing members of their class. Beyond that, they did not seem to be a very cohesive group. Socially, Joanne and Yvette, and to a lesser degree, Melanie and Valarie had the most to do with each other outside of school. Katherine seemed to be the loner but more by choice than circumstance. In terms of work effort, the students could be viewed on a continuum; the most work and preparation for class was done by Katherine, followed by Valarie, Yvette, Joanne down to the least amount done by Melanie. The reasons for the differences will be discussed later in the chapter. Katherine, Valarie, and Yvette all had concerns about taking Law 30 over the PictureTel system and did not always enjoy the way Mr. Callum ran the class, but they did not seem to be personally antagonistic toward him. Indeed, they were quite prepared to put up with the situation in order to get their course credit. However, by the second interviews in October, a month into the course, it was evident that part of the dissatisfaction felt by Joanne and Melanie about the class was directed at Mr. Callum. Their perceptions of him coloured every aspect of their involvement in the class.

Katherine

I found Katherine, a grade twelve student, to be a thoughtful and sometimes critical person but she often showed her gentle humour in her analysis of a situation. She described herself as a happy person with a busy and varied life. Indeed, when I came back to interview her for the final time, she had been out hunting with her father. Clearly a self-contained person who liked her class mates, she was willing to help them but was careful not be taken advantage of by them. By the second interviews, Katherine was angry with some of the other students who she felt were wasting class time by engaging in various distracting behaviours, but at the same time identified the cause of their discontent. In our discussion about the new school division policy of a full timetable, she stated:

> It's like all the other classes we're in you had to have a full timetable this year. People are there even though they don't want to be there so you are not walking into a situation where you are eager for people there to learn more ... not only did a bunch of them want a spare that's their problem but

> if they want to take a spare in my class and waste my time ... then it's our problem ... the division didn't see that as right [for students to have spares] but I think it's really wrong to waste my time (I, Oct. 8, p. 19, K)

Perhaps Katherine was least rational when she talked about the Hillview students whom she seemed to dislike mostly because of a traditional school division rivalry between the two schools. She admitted that she had never actually sat down and talked with any of the students from the sending class but did not think the two groups would ever become one class "because we never see each other, there's never a hope that you can really become one class if you don't know each other" (I, Oct. 8, pp. 8-9, K).

Of all the students in the Law 30 receiving classroom, Katherine's approach to learning was the most effective because of her active learning style. She described herself as fairly well organized but a slow reader and to retain information she read the material several times, then: "I go back through the main points and study the main stuff and go over the vocab until I can give myself the definitions right" (I, Oct. 8, pp. 1-3, K). She did not make study notes because she found "I don't learn from writing notes, I can sit in class and write and write, like Biology we write notes in class and after class I have no idea. I have to go read those notes". When she prepared for the news article oral presentation, she changed this approach slightly:

> I write out the full essay or whatever on it and then as an oral read it over a couple of times and until I understand it and then just read points so I can do it in class orally. (p. 2)

Katherine's strategies for learning were applied in all her classes, not just the ones she was taking through the PictureTel system and she summed up with the comment: "You have to put in the time and be willing to sit in class and listen. Listening in class is what it comes down to."

Joanne

Joanne, a grade eleven student, had striking long black hair and described herself as an outgoing person with a strong interest in sports. She was on most school teams and played fastball on a local senior girls team as well. Joanne appeared to be a student in turmoil, often contradicting herself in our interviews. She had trouble clearly articulating

what she thought or wanted in the future:

> I had hoped before to take a Sports Physiotherapy course but from what I hear you have to have fairly high marks for that so I want to do something with sports. I, a friend of mine is in broadcasting like scouting that sort of thing. I kinda thought that was a neat idea. I just want something to do with sports like even Phys Ed or something. (I, Sept. 8, p. 2, J)

Joanne disliked the PictureTel system for a variety of reasons. First, she said she preferred to take a class in the traditional way with a teacher present in the classroom. The long range tentative plans of the school division include offering senior math classes over the system in the next school year and this worried her:

> I don't think for elective classes it really matters, but I don't think classes that are so important, like G.T. and Algebra and English, I don't think they should be ... they must have, like a Math teacher there, because he's teaching Algebra and sending it here and we already have Math teachers from here. I don't understand why they're doing it like that. (I, Oct. 6, p. 78, J)

Joanne was also concerned about her appearance on the monitor and was self-conscious about "goofing up" when she had to answer a question over the system. This was not the whole reason for her self-consciousness. In a discussion that Joanne and I had about the students at the sending end, part of the reason was social, as Joanne suggests in the following dialogue:

> J: I just wish we didn't have the camera there so they weren't moving the camera around, like they're always fooling around with the camera, zooming in on me and I hate it ...
>
> I: Who do you think is zooming in, Mr. Callum, or the students?
>
> J: The students.
>
> I: It's one of the boys?
>
> J: Yeah, it happens in my Psychology class [her other PictureTel class], too.
>
> I: The same boy?
>
> J: Well, I don't know, they do it anyway.
>
> I: Are those boys in that Psych class, too?

J: Yeah. (I, Oct. 6, p. 6, J/R).

Joanne was easily frustrated with the Law 30 class. Perhaps, this was partly because of her poor ability to express herself in a class that required students to express themselves, but also her passive learning style and a tendency to blame her problems on external elements caused her many problems. For example, on the question of rewrites after the first major unit exam, she misunderstood the teacher's comments even though the rest of the class seemed to grasp what they had to do:

J: the way everyone in that class understood ... was that Mr. Callum was going to give us one re-write throughout the year ... like you could re-write any test. And that's what everyone ...

I: Just one chance?

J: Yeah. We all could write one, it didn't matter which test. And everyone failed the first test except for me, well Bruce got 50 and Katherine got 88 or something, so I wasn't going to rewrite because, like I passed so I figured I didn't want to.

I: So you thought you'd use your chance up later on?

J: Later on. And then that day Mr. Callum said, "Well, this is your one and only re-write" and I said, "This is our only re-write!" so I wrote it without studying. I didn't even open a book and I wrote it. And I got two marks higher ...

Often Joanne was quite simply not listening to what was being said by the teacher or the other students in the class.

Yvette

Another grade twelve student, Yvette, was in a sense, the "joker in the pack". Although she had a casual attitude to school, Yvette had an ironic sense of humour and loved mischief. Yvette also seemed to grasp how some aspects of the technology worked, faster than some of her Durham classmates; one example was the keypad. "There's a mike in the control panel, but some of them don't realize that (laughs) ... or didn't realize just how far our voices actually do carry" (I, Oct. 8, p. 16, Y).

In contrast to school, Yvette was quite serious about her dancing. After finishing school and working for a couple of years, she hoped to get into a dance school or a Parks

and Recreation program. Because dance classes took up so much of her time, she was no longer involved in many school extra-curricular events and did not have much opportunity to meet the Hillview students outside of the classroom: "I'm too busy dancing ... I've never met, I know who they are, like, I've seen them before ... I knew the older kids, but I didn't know the Grade 12 or 11 students" (I, Oct. 8, p. 7, Y).

My initial feeling about Yvette was that she was telling me what she thought I wanted to hear. Over time she seemed to become more comfortable talking to me and, as a result, she became very frank in her interviews. Although Katherine provided a lot of insights about how the system and class operated, it was Yvette who provided a lot of information about the human dynamics which evolved out of learning over PictureTel, both inside the Durham class itself and in relation to the Hillview class.

Yvette found school easy, putting little effort into it and freely admitting that she was a procrastinator when it came to school work. However, as the weeks slipped by, she became visibly more involved in the academic part of the class. I believe this was for two reasons. As Yvette said herself, she liked application type questions in the second unit dealing with the Charter of Rights and Freedoms as opposed to the more theoretical introductory unit based on the history and traditions of our legal system. The second reason was more complex. Unlike Katherine, Yvette was not a loner and she liked being part of whatever off-task student behavior that was going on, but not to the point that she was noticed by the teacher at the other end. In other words she was not prepared to alienate Mr. Callum.

Melanie

Melanie described herself as a fairly easy-going person, although this did not seem to be true of her feelings about Law 30 or Mr. Callum. Her plans for the future included training as an veterinary assistant after spending the first year out of high school abroad. Melanie was not a strong student and initially hoped to pass the class but as she became more and more frustrated with the PictureTel system, she treated the Law 30 class as an unofficial spare: "I don't need it and it's a poor attitude to have but, it's just like a spare or something for me. So I can get other things done" (I, Nov. 8, p. 4). When asked how much time she was spending working on the class, outside of class, she replied, "None,

absolutely none" (I, Nov. 8, p. 3).

Melanie could sometimes articulate clearly what she disliked about having to take a class over the compressed video system:

> When your teacher is talking to you directly [it] is not like a conversation it's more like a phone conversation because you can't see them until ... like voice travels faster than the motion ... so if he's trying to describe something with his hand and he's moving his hands, the hand signals don't get to us at the same time as his voice does, it just makes it harder to understand. (I, Sept. 7, p. 3, M)

Unlike most of her Durham classmates, she actually had friends in the Hillview class and socialized with some of them occasionally when their paths crossed like at a local rodeo.

> Yeah. (laughs) At ____ Rodeo, we, ____ was telling me about it. He thought his report was better than mine ... and my friend, I've known her for quite a while, but we've never talked over PictureTel. I know quite a few others. (I, Oct. 7, p. 7, M)

In addition to her resentment of the school division policy of a full timetable, perhaps one of the reasons Melanie withdrew from active participation in the class was her fear that as low academic student she might appear "dumb" to her distant friends who had never seen her in a classroom context before and part of her method of coping with the situation was to quietly rebel against it, saving face.

Valarie

All small rural high schools have or should have a "Valarie". Valarie was one of those tireless workers, often found in the senior class, usually female, a member of the Student Representative Council, the yearbook editor, and committed to getting a multitude of jobs done, more because someone had to do them than for any personal glory. As she said herself "it's very odd that I don't get everything done" but admitted that after a school day and a bus ride home she usually waited to do her homework "after supper 'cause I get off the bus I'm tired (laughs), I don't feel like doing any work after all day" (I, Oct. 6, pp. 1-2, V). Like Katherine, she actually enjoyed the content of the course:

> I liked the idea of it. I've always liked arguing with people so (laughter). It's an interesting class. I like learning about the different parts of Canada and the system, especially the law system and that. I did a report last year

> in the American government and Canadian government and it got into the different laws and judicial systems and that. It was really interesting so (pause) I thought I'd try it. (I, Sept. 7, p. 2, V)

As well, Valarie had taken Law 30 because she did not have the prerequisite for a computer course being offered at the same time. To complete her requirements for grade twelve, she also needed to take a social science elective. Although Psychology 20 was also offered on the PictureTel system, with Durham School as the sending school, she found that Mr. Callum's class was a better fit for her timetable.

Valarie did not like taking three of her classes by PictureTel but she accepted the system as it was and as a way to get her classes without taking some of them by correspondence, which she had tried in the past. At times she even sounded desperate about acquiring all of her credits to finish school: "I don't really like it that much, but I'm willing to accept it the way it is. That's the way it's got to be" (I, Oct. 7, p. 10) and "I know this is a really bad situation for us because the Grade 12's that are in there, we have to have this to graduate, we have to have this credit ... and I have to get a fairly decent mark" (I, Oct. 7, p. 14, V).

Valarie also saw that some of the problems of the class was having as faults with the PictureTel system and a lack of school division preparation of the students before the class started:

> Even if between the schools, if you could get the kids a little familiarized with each other before, 'cause I know that's one of the biggest problems that we're having ... even between the teacher, we really aren't communicating that well, but that's just because their schools [other schools in the Wheatbelt School Division] get along, but not ours. (I, Nov. 8, pp. 4-5, V)

She also blamed the behavior of some her classmates: "I mean those that don't want to be in the class, everyone knows who they are and I just, if they don't want to be here that much I think they should just leave" (I, Oct. 7, p. 12). However, my observation notes indicate that Valarie some times described her behavior as being better than it appeared as she sometimes joined in off-task behavior going on around her.

Valarie's approach to the technology was determined and methodical. She recognized that some of her classmates disliked aspects of the medium: "a lot of people

have a problem with the camera being on them but they get used to that, too. They can't shy away from that all the time" (I, Oct. 7, p. 15, V). Valarie determinedly spoke up and made an effort to answer Mr. Callum's questions and sometimes offered her own comments.

Mr. Callum

Mr. Steve Callum was in his fourth year as principal at Hillview School. Prior to this, he had ten years teaching experience at a junior high school, the last five years there as the vice-principal. His teaching experience was mostly in middle years English and French. However, he had taught a number of other subjects such as middle years Social Studies, elementary French and Physical Education. His administrative time varied between 50% and 75%. Clearly, he had a broad range of teaching and administrative experience.

Mr. Callum was teaching Law 30 for the second year, but this was the first time he had taught using the PictureTel system. To some degree he worried because, with his teaching background and experience, he did not feel he knew the Law 30 age group well. "It's just that this is only my second year of teaching Law and it's only my second year of working with students at the 20 and 30 level. It takes a while to get accustomed to them and the way they operate as opposed to working with the middle years students" (I, Oct. 12, p. 12, T). He clearly loved the content of the course and was always collecting newspaper clippings related to the class content.

Mr. Callum's expectations of his PictureTel students were clear when he said "because one of the features that I think about is that they have to accept some responsibility for their own learning and that I can't be there all the time and I'm assuming they are doing their reading ... that's part of their responsibility to be prepared and ... that's their end of the bargain ..." (I, Sept. 2, p. 7).

Mr. Callum was also part of the Educational Program Committee in 1991 and he was interested in possible innovations for solving some of the programming problems of small rural high schools. He also was proud of the fact that the Wheatbelt School Division had arrived at its own solution rather than one that was imposed from outside.

Mr. Callum brought a professional attitude to his work. His tenacious attitude to hard work came through when he says "each week I try to think of what I could do

differently, what types of things can I do that I haven't done or haven't thought of that I should make an attempt at trying and see if they'll work better than other methods" (I, Oct. 12, p. 5, T). In his second interview, six weeks into the course, Mr. Callum indicated that he felt some frustrations with the age group, the technology, and the course which he did not feel overly experienced at teaching. However, his willingness to take responsibility for his part of the educational process and preparedness to work even harder came through in his comments:

> It's hard, there's no question, I think, it takes more preparation. I really try and put down exactly what I want to do and ... I try to put all my materials together that I'm going to use. Even at times I've done a class, you know, I'm all prepared and know what I want to do and then things didn't go quite the way I wanted them to. Or we didn't get as much covered as I had hoped we would ... you're always thinking what can I do differently, what can I do that I haven't done before, and try. (I, Oct. 12, pp. 12-13, T)

Mr. Callum had a reputation as a fair but firm administrator and a team player in the larger division scheme of things. He was also viewed as someone who was excited by new ways of doing things in his school.

How Mr. Callum coped with teaching Law 30 over the PictureTel system became clearer as the story unfolds. Perhaps it is safe to say, he was committed, fairly confident and a little apprehensive before the class began. His outlook remained much the same during the time I spent in his class. Even though, at times when he was discouraged and frustrated with the progress of the course, he was far from giving up.

In the descriptions of the students and the teacher, I have touched on a few of the issues to be discussed at greater length in this summary. Some of these concerns had to be included as I described the students because each individual had a different way of dealing with and coping with the class and the technology. Also different topics had varying degrees of importance to each member of the class.

The Case Study

Administrative Concerns

When the Wheatbelt School Division decided to find and use a different distance education medium rather than using one of the other forms already in place in

Saskatchewan, one of the strongest underlying themes in their choice of PictureTel was the notion of finding their own solution. This meant heavier financial responsibilities than if they had tapped into one of the other systems but on the positive side, they could also utilize their own resources. Mr. Callum summed up some of the administrative pride of accomplishment in being educational leaders instead of followers:

> There's a lot of pride in that because we are a small school division ... and traditionally teachers in this province have tended to view that if there's improvements or there's innovations in education they happen in Regina and they happen in Saskatoon and, you know, when the rest of the folk hear about in the outlying areas well then they'll maybe catch on to something ... the approach has been, from the point of view of the board ... was that we cannot afford to sit back and have things dictated as to how a division is going to be run ... and not have a whole lot of say and so I think they took the proactive approach ... even though we knew that if it was going to fly it was going to be pretty much funded entirely by the board, that even though we asked for government support the likelihood of getting that was pretty dim and it's still the case the board is funding our distance ed initiative even though other divisions in the province are funded by SCN ... this allows us to make use of our personnel within the division and I think we felt we had talented people within the division and it was just how we could access their services ... and that's where the technology certainly lends itself ... because more rural school divisions shrink, just as ours are doing you tend to be hiring teachers whose teaching load looks like everything from A to Z and this allows us to keep teachers within their area of expertise. (I, Sept. 2, pp. 10-13, T)

Full timetables. A new school division policy requiring students to have a full timetable generated considerable student resentment. Katherine, Yvette, and Valarie reported that they took Law 30 because they did not have the prerequisite for one of the other classes offered at the same time, they had taken some of the other choices like Psychology the previous year, they had tried taking a correspondence class in the past and had either dropped it or had really disliked this method of distance education: "It was either that or Psychology and I took Psychology last year ... we had to have a full program" (I, Sept. 7, p. 2, K); "like, I have my social science already, I took Psychology so I don't need to take Law but I can't take I.A. so that's another reason I kind of have to take it because you're not allowed spares" (I, Sept. 8, pp. 3-4, Y). Mr. Callum also saw that the policy of full time-tables was affecting students behavior and attitude in class in Durham:

> This is the first year in Durham not only for the technology, but it's the first year that they've had to take a full load. And there is no question that is something that, I think, is in the back of people's minds ... they had to take this. It wasn't that they wanted this class, they had to take it. They had no choice. (I, Oct. 12, p. 11, T)

Katherine also suggested that there was a need for supervision when some of the students have not willingly chosen to take the class: "that those rooms be supervised ... I think it's just a matter of they [the school division] have to realize that somebody has to be there because there's people there that don't want to be there and they're making it harder for the rest of us (I, Nov. 8, p. 5, K). Indeed, Mr. Callum addressed this very issue in September:

> I think we decided we needed to be very blunt with people up front. If you're going to be in this, it's because you choose this, we didn't force you there and if you're going to be here, it's to work and if you're not prepared to work you're out. (I, Sept. 2, pp. 7-8, T)

Mr. Callum reported that if a student was removed permanently from a PictureTel class for discipline reasons, the student was required to pick up a correspondence course in its place. According to division policy, the student was also expected to personally pay the tuition cost.

Administrators as PictureTel teachers. Mr. Callum and the principal at Durham School, Mr. Green, felt that they would have more credibility with their teachers if they were not only the administrators of the PictureTel project but actually teaching a class as well:

> I think part of it could be that now we have an administrator doing it, I have more of a stake in it. It's higher on my priority list than maybe it was last year. And that was a point that we had seriously taken. That one of the administrators had to do it. (I, Oct. 12, pp. 27-28, T)

Administrative cooperation. There were many examples of administrative cooperation besides the common time-table and bell system and the same school year schedule for terms, reporting periods, and parent-teacher interviews. On September 1, the first Law 30 class was held at Hillview School. The two principals, Mr. Callum and Mr. Green, had arranged for all of the students to be together in period 5 rather than in the

scheduled period 6 so that the Durham students would be able to travel back to their home school in period 6, in time to catch their school buses at the end of the school day. Sometimes, internal school activities such as students working on the school newspaper (Melanie and Valarie) or handing out yearbooks (Katherine) led to interruptions during the Law 30 class. However, sometimes a common school activity, like a volleyball tournament, would allow Mr. Callum to visit his Durham class if he was accompanying a Hillview team; when the senior Durham volleyball team visited his school, he usually made a point of meeting with any of his Durham students that were on the team. Mr. Green, the Durham principal, often came in at the beginning of the class to turn on and adjust the equipment; if he did not appear then, usually sometimes during the class he would come in and observe for five to ten minutes. At the beginning of the class, the principal in the receiving site would also hand out new assignments, corrected assignments or comment sheets that had either been faxed or hand-delivered from Hillview School.

Student numbers in respective classrooms. Another administrative concern was the number of students in each of the classrooms. Mr. Callum discussed this issue, at some length, in the first two interviews:

> So that's where the rule of, I mean it's not a rule, but generally you try to stay around 20 or below the 20 ... because it's [PictureTel] so interactive ... to a large number of students that their access to you is very limited ... if you want to have a quality program you can't put 30 in a class ... there will be bigger groups in Durham than there will be in Hillview. It probably would have been more effective the other way around. (I, Sept. 2, pp. 6, 26-27, T)

> You know that you've got more kids there and you're trying to make sure that they're always with you ... I would rather the big numbers were in Hillview. In theory that's what we wanted. And I think that in reality now we realize that is what we're going to have to deal with and that the next year when we time-table we will have to put all our numbers in place at the end of May so we know exactly who's got the larger numbers and that's going to be the sending site ... and the smaller numbers, the receiving site. (I , Oct. 12, p. 7, T)

Yvette, one of the students in Durham, recommended the receiving end should have no more than seven in a class:

> 'Cause if you get too many ... it seems to hinder the camera's ability to take in that many people and then that many can goof off ... for the space the camera takes in, yeah, 'cause if you want to see everybody then, and you want to have everybody paying attention. I think maybe six or seven, seven at the most maybe. (I, Oct. 8, p. 8, Y)

Scheduling problems. On September 20, 22, and 24 the Durham class was late in starting. At this stage, I was observing at the Hillview sending site. Initially, I wondered if there were technical difficulties in linking up. When Mr. Callum dialed through, there was no answer at the other end. Durham's bell system was actually about five minutes behind, perhaps as a result of power outages, common to that area. By the time the Durham students were settled in their desks, the class started about ten minutes late on those days. On October 15, when I was again observing at the sending site, Mr. Callum dialed through to Durham. While he did this, we could see the empty dark classroom at the other end. Finally after a few minutes of informal discussion about the guest speaker who had visited the previous day's class, the teacher decided to have a Hillview student proceed with her scheduled news article presentation even without the other group's presence. Fifteen minutes into the class we heard the Durham students knocking on the outside of their classroom door. Finally three minutes later, the Durham classroom door opened and two students appeared. They told us that the rest of the class were finishing a Physics exam; they seem tired and talked quietly about their exam. The Durham school secretary came in and turned on their monitors so that they could see us. Mr. Callum did not appear to have been informed in advance by Mr. Green of this exam or any other occasion when a receiving class student was going to be absent from class for some in-school business.

Interruptions. Several unnecessary interruptions also occurred during class at the Durham end. On September 10, the secretary walked into the classroom to deliver the school newsletter and on October 21, Katherine arrived during class to deliver the school yearbooks. On both occasions, the Durham students basically "shut down early" as they proceeded to read the items that had been handed out and in the case of the yearbooks, exchanged among themselves for autographs. Mr. Callum did not seem to react to this, but I found it distracting as a classroom observer. Sometimes there would be a knock at the door, a student would be called out and would be away from the class for a few minutes

with no explanation given to Mr. Callum. By early October, he began to ask the Durham students where they were going, even when it was to the washroom.

Examination supervision. For examinations, preparations were closely coordinated between the two schools. Mr. Callum described the procedures:

> What I'd do here is fax the exam there to Bill [Mr. Green] or the secretary and they will make sure the exam is run off and they will make sure someone supervises the exam. We can link up and I can go through the exam with them, answer any questions and they can have someone in the room there who's supervising them and then break off with them. I'll supervise my students in Hillview and . if they have a problem all they need to do is just pick up the phone. (I, Sept. 2, pp. 15-16, T)

I arrived on their examination day to find the Durham classroom rearranged into widely spaced rows, unlike the usually tightly packed wedge-shaped formation of regular class. The librarian technician was there to supervise the class and hand out the exam. Mr. Callum came on the monitor and briefly discussed the format of the exam; Valarie and Katherine had several questions for him which he answered. Then he disconnected and they proceeded to write their test quietly.

Teaching Concerns

In our first two interviews, Mr. Callum and I touched on a number of issues that related specifically to being a PictureTel teacher. Teachers were selected on the basis of their willingness to participate and were usually subject specialists. He felt that successful teachers using the system "had to be the kind of people who are willing to take risks, and willing to try something new, willing to fall on their face so to speak ... not afraid of technology ... outgoing and kind of positive" and that some teachers "didn't like the technology ... they liked the traditional ... with kids in the classroom, could see them and touch them ..." (I, Sept. 2, p. 25, T). Teachers who had taught a class over the PictureTel system divided into two groups: those who continued to teach on it and those who tried for one semester or one year and never taught over the system again. Although Mr. Callum felt that if the latter group had tried it again:

> They'd find that we've gotten better at it. We've learned some things and that's just natural, that in anything new, I mean it's going to be a learning process and we'll find things that you gotta fine-tune or maybe not do

> because they didn't work. And we learned that about the numbers. The first time we did it we had 21 kids here, or 21 kids up there and 17 here. (I, Sept. 2, pp. 25-26)

For those teachers that did become involved, there was a feeling of professional growth and a feeling of camaraderie with other colleagues who were also involved:

> There is because they're all in somewhat the same boat. I know whenever I see people outside the school who are involved in PictureTel that's ... something that we talk, that I talk to them about. There's more discussion about it now than ever before. Part of that is because we have more people now than ever before. (I. Oct. 12, p. 27, T)

Mr. Callum also reported that there is no formal supervision of teachers in their first year of PictureTel teaching because of its newness and the pressures the teacher already has to cope with.

Teachers were encouraged by administration to make at least four to six visits to the receiving classroom over the semester or the year. When these trips were made, their mileage was paid by the school division. As Mr. Callum suggests "I don't think anyone should be out of the pocket because we really felt that it was important that the teacher did go a number of times to the receiving site and feed the class back the other way" (I, Oct. 12, p. 30, T). However, the PictureTel teachers were not given more preparation time than other teachers.

Before the Law 30 class began, Mr. Callum thought that it would be similar to teaching any other class in terms of the instructional strategies used.

> By the nature of the class and the nature of the subject it is critical that there be discussion and I guess that was in the back of my mind that I had to be really cognizant of throughout the entire year is that I have to make sure that those people in Durham are with me all the time. One of the things that Bill [Mr. Green] suggested that we do, look at directed questioning ... you have to have a really good plan, I guess of where you're going and how you're going to get there .... (I, Sept. 2, p. 5, T)

In our second interview, he reported that he found it difficult to get through as much material as he would in a traditional class and this had also affected what material he chose to cover with the students:

> In my own mind I thought this is really dragging ... I'm not maybe going

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> as fast as I should. And yet when I've drawn back and I've talked to the people who've done this, they had said, "Look, over this technology you have to understand whatever distance ed you're doing that you're further ahead to do maybe a little less and do that well than to try and pound a lot at them in the same amount of time." ... So I used that advice to shorten it up and try and end up with sections I thought had some application to kids down the road. Some have direct application right now. Like the Criminal Code will, the Young Offenders will. (I, Oct. 12, pp. 8-9)

Clearly, there had to be careful planning for teaching a course over PictureTel, both at the beginning and during the course, but there also had to be flexibility to make changes as needed.

Mr. Callum coped with some of the problems as he went along by asking students to let him know about concerns right away rather than further along in the term. He also made periodic visits to the receiving site. It was after one such visit in October that he asked the Hillview students to repeat their questions and answers because the Durham students could not hear them. The Durham students were also more attentive after this visit (O, Oct. 19, p. 139).

Mr. Callum hoped that some of the scheduled field trips to various courts would also bring the two groups together:

> The field trips ... those kind of activities will help to sort of build that goal that they are one class ... We've got a court case coming up in December, which is a trial here. And it's in Provincial Court and what ... I wanted to do, was to have the kids brought down here for a day and by giving them a good opportunity to spend the time with the kids here in Hillview, have lunch together, talk about what we saw, and then go back the other way to Queen's Bench Court. And it's in Saskatoon, and we'd pick up the kids in Durham and go back the other way. (I., Oct. 12, p. 30, T)

Certainly, Mr. Callum seemed to be preoccupied by the course and he admitted this in one of our interviews:

> Each week I try to think of what I could do differently, what types of things can I do that I haven't done or haven't thought of that I should [in] an attempt at trying and see if they'll work better than other methods. And I guess going back and talking to Bill Green ... and talking to some of the others who have worked with the technology to find out from them what seems to be working, what doesn't seem to work. (I, Oct. 12, p. 5, T)

And later on in the same interview he added that:

> You're really thinking about this subject all of the time. When I read the newspapers ... find as many law articles, when I listen to the news, whatever. I'm trying to pull in as many sources as I can to help make the class better. I think all teachers do that. I'm just a little more ... in tune with this subject partly because, ... it's PictureTel although that is new I've got to get in there. (p. 14)

Class Format

On the first day of classes, Katherine asked if classes would be primarily application and discussion. Mr. Callum replied that this was so but he also wanted to set aside one period a week for the news article presentations and the discussion that followed it; he would hand out the criteria for the assignment and a presentation schedule, as soon as possible. The usual daily routine, except for exams and the days that students made their own presentations, consisted mostly of teacher led discussions with students like Katherine, Yvette, or Valarie contributing more answers than the rest of their classmates with the exception of Bruce, who was not interviewed. No class time was given to students to work on questions, to make notes, or to discuss the day's topics among themselves or directly with the students in the other classroom. Joanne thought that they would be given time in class to work on questions and do their readings but this had only happened one day when Mr. Callum was away (I, Oct. 6, p. 11, J).

Mr. Callum's response to this was:

> We're looking at a tutorial kind of thing where they have their pre-reading and when I've gone back at what the kids had shared as to possible careers, interests, things like that, the majority of them seem to want to go to university or some post secondary institution where they are going to have to have acquired the kind of skill such as pre-reading and doing note-taking on their own, and being responsible for their own learning. So it's asking them to start accepting some of the responsibility for things that they're going to see next year. (I, Oct. 12, p. 2, T)

Advantages of class format. Some students thought the teaching format and the teacher's style was similar to the format of a university class tutorial. Yvette had found the format a change from what they had in most classes or in earlier years, but she found that she could deal with style quite well if she did her readings "because I have trouble listening

... then I'll read it and then I'll understand it". She said: "This will be good ... for when we go to university or college or whatever" (I, Oct. 8, pp. 10-11, Y). Valarie had not realized that the class would follow this style and thought the students should have been made aware in advance: "I mean, the way he set it up, we're going to run into that lecture type, when we go on to post- secondary education anyway ..." (I, Oct. 8, p. 9, V) but felt there were advantages to be gained from taking a class through the PictureTel system:

> More individual work and even work as a group because basically you're in a room without a teacher so you have to help each other and ... you take more initiative to say what you think because there are so many people and you have to get across to everyone ... especially the people you don't know ... before in your small classroom ... you might not speak up but now you're learning you have to. (I, Sept. 7, p. 3, V)

Disadvantages of class format. Katherine suggested that this lesson format was chosen "because they are afraid to spend the money on basically nothing happening ... I think like you've noticed we don't do a lot of work kind of ... there's an assignment but no time for work ..." and that "the student has to be prepared to do the work on their own basically. It seems like you're doing your work on your own and the teacher's there to go through problems" (I, Oct. 8, pp. 11, 15, K). She felt that the class format was a restrictive way of learning with little potential because all the various teaching strategies a teacher could use in a regular classroom were gone.

Melanie was asked to describe what she thought the typical PictureTel class would be like, in the first interview of the year. She replied that "the people in the classes behave as just well as if there was a teacher in their class but sometimes it's hard for them to understand the delay and everything." By her second interview in October, Melanie, who had become very negative about the class, described why she disliked the class format:

> M: And if you were to read the article in his class ... and he was right there and you had a question, you could ask it right then. But if you take it home and read it and have a question, you forget about. So you don't ask him. And it seems, he gave you an assignment to do ... if you're doing that at home you are not going to ask. Like you're not going to phone him. (I, Oct. 7, p. 13, T)

When I asked her if she realized in September that the class would follow this format, she

replied that she did not, but she was not clear on what she anticipated.

Valarie did not realize the class would consist mainly of discussion and lecture: "No, I didn't. But I've had to make time for a lot more work ... five or six hours [out of class]" (I, Oct. 7, p. 10, V). However, she saw learning to use this style of learning had potential for post-secondary education: "We do more individual work, we don't have to work as a group. It's up to us to get our work done ... it'll be good for when I go on in school" (I, Oct. 7, pp. 15-16, V).

Even though the students came to realize the tutorial-type format would be followed, not all were willing or able to adapt to this style of learning. Mr. Callum was also becoming increasingly frustrated by the lack of involvement of many of the Durham students. I spoke to him the day before he went to the receiving school for a visit; on that day the class would be sent from Durham to Hillview. His frustrations were clear in his comments:

> I'm planning on meeting with those kids prior to the class for about a half an hour, and I'm going to go over a lot of the things that we've already talked about. The fact that we have some that are involved and we've got others that are not involved ... the aim is to share answers, and comments like "I don't know", "I agree with that person" is not going to cut it. And that they're going to have to qualify everything that they say with reasons why. It's not enough to say "I agree or disagree" ... it doesn't work in any other class, why should it work in mine. And it doesn't work in the discussion and when the majority of those kids want to go on to some ... post-secondary training that kind of approach will not work. (I, Oct. 12, pp. 9-10, V)

Pace of Class

The students also commented that the pace of the class which seemed to move more slowly than a traditional class. They mentioned two reasons for this. The first reason was the picture and voice delay that occurs with the PictureTel system. The second and probably more important reason to the students was Mr. Callum's questioning and checking for understanding which was more difficult since he had to deal with two groups. In my first interview with Katherine, held after two PictureTel Law 30 classes, she had this to say about the pace of the class:

I think it's a lot slower than a normal classroom just because the way the

> picture moves, like the sound always seems to be behind everything else ... patience! It's slow, oh it's slow and everything goes wrong ... it slows everything down ... we can't link up ... the sound isn't coming through right or they're not clear and something goes wrong. (I, Sept. 7, pp. 1-2, K)

I made a note to ask the students about this again at the second interviews held in October. All of them said they still found the pace slow and that it was even slower in some of the other PictureTel classes but that they had gotten use to this slower pace. Katherine suggested that the slow pace had more to do with the teacher's style than the technology (a contrast to some of her comments in the first interview). Initially, there had been a number of technological glitches at Durham school probably because the system had just been set up, whereas it had been in place in Hillview School since the beginning of the project in 1991. Katherine had also become more familiar with the teacher by this time and the way he taught:

> It's still slow but I think I realize that's more his doing than of the class. I find the class slow because he's always giving examples, examples, examples ... it's still slow because of the technology but it's not as slow as I thought it was originally. (I, Oct. 8, p. 9, K)

Valarie, in contrast, blamed the slower pace on some of her classmates.

> I think it's still slow. I mean, it's been, what, three or four weeks and we haven't even got past the [first] unit yet. It's slow that way, but, I mean it's going to remain slow if some of the people don't improve their attitude toward the class itself. (I, Oct. 7, p. 6, V)

Advance Preparation of Students

Preparation of the receiving students was minimal before the course began. Joanne said:

> Mr. Green sat me and two other people down and told us because we were the only ones in my grade [grade eleven] taking anything by PictureTel and he showed us how everything worked ... just one day, like at a break or something he showed us. (I, Sept. 8, p. 1 , J)

Yvette, too, reported that the grade twelve students really did not have any time to familiarize themselves with the technology before the course began, beyond an information meeting the year before. She felt that if students would have had more time to work with

PictureTel in advance, they "probably wouldn't have been so pessimistic when it first started out" (I, Oct. 8, p. 19, Y). Even in the opening day class, when the two groups were together at Hillview, Mr. Callum did not spend any time demonstrating how to operate the equipment or on any other day that I observed. For example, Valarie was not aware that each lesson could be taped daily for students who were absent until I informed her of this in her interview. Katherine, in contrast, felt that "I don't know if there was anything that they could tell you. I think we do have to know that a lot of this is up to you, if you're going to take this class, you're going to work" (I, Oct. 8, p. 11, K).

Technical Considerations

Obviously, the use of any technological device in the teaching process has some impact on the participants of the process. This observation was certainly true of PictureTel but not always in the ways that might be expected. The way the students and the teacher used the technology often made the most impact on the perceptions people had of their technological effectiveness. The document handler was a technical component unique to PictureTel but it was not used in this class. Other characteristics of the technology such as sound sensitivity generated some very negative emotions among the receiving students, but they learned to cope with it, to some degree.

Classroom arrangement and set-up. Mr. Callum detailed many of the problems of setting up a PictureTel classroom in our first interview. He also described features that improved a classroom being used for this purpose:

> We had to work on some things in terms of the sound: wanting to make sure that kids could be heard, they could hear us. And again, then you had to look at things like lighting, look at things like acoustics, and I know that, uh, I guess up to a week ago when Bill [Mr. Green] and I first linked up and I was talking to them in Durham and it was just him in the classroom and he said, "Boy! Is there a bounce in there!" There's an echo. He said, "Yeah, you're right." and, you know, maybe they couldn't hear it at their end, but you could sure hear it when it's coming back to me ... I said, well, you know, there may be less of a bounce once you get kids in there because there's, you know, more people soaking up the sound. But my recommendation was carpet on the floor, do some other acoustical things to help improve ... This is the best room because we've got the ceiling tile, we've got the bulletin board all around the walls, you've got the carpet, we don't have a lot of hard surfaces, or surfaces that are going to bounce the

> sound around. And we had to do some other things; because we have windows in three corners we had to install blinds because we were getting light reflecting back ... and those were some of the things we had to do. And I think it was just to be cognizant of the acoustics, the sound quality, try to make sure the picture quality was as good as we could get. It would sort of be technical things that one had to be really aware of ... those are things you can work at and can improve the sound quality, you can improve acoustics. The picture quality, no, you do the best that you can but what we found was that within a period the kids were used to it. (I, Sept. 2, pp. 21-22, T)

Camera and picture quality. Although the PictureTel camera has four pre-set positions, they all covered a cone-shaped area. In other words, we see a triangular-shaped area in the other classroom on our monitor. On September 8, Mr. Callum reminded the Durham class to make sure their rows were staggered so that no student was sitting directly behind another. (See Appendix H for the respective classroom seating arrangements). He also said that windows and curtains should be closed to avoid background noise and glare on the screen. The blackboards were to have been replaced with whiteboards to cut down on the dust which could affect the PictureTel unit. Writing on whiteboards also showed up better for the class at the opposite end, an advantage for the Math teacher sending to another school. By September 30, the whiteboards had been installed in Durham. Whenever students made presentations at either end, the camera was refocused to give a close-up picture of the student presenting. With PictureTel's special "picture in picture" feature, it might have been helpful to the close-up picture of the student and a wide-angle view of the rest of the class. This was not the case. On October 15, when I was observing from the sending classroom at Hillview, Joanne made her news article presentation. We could see and hear her clearly, but in the background other students could be heard giggling. At one point, she too began to snicker, but regained control. Clearly, some distraction was taking place outside of the tight focus picture.

After a month, I asked the students about what they thought of the picture quality. Melanie said:

> You kind of get used to it. But it still could be better ... it's hard to watch, like you know, if you're watching a TV show and it's dragging along ... like if you put a video in a VCR and it goes slow ... . (I, Oct. 7, pp. 4-5, M)

Katherine thought there were five people in the other class but she was not sure because "there's usually two or three faces that you can see" (I, Oct. 8, p. 9, K). Melanie found that she could usually see two at the most besides Mr. Callum, but felt the problem was caused by the seating plan used in the Hillview classroom (I, Oct. 7, p. 7, M). Most of the time, I also found that I saw two students and the teacher. Perhaps the students may have had some expectation that PictureTel would be similar to the picture of regular television.

The Durham students also wondered how well Mr. Callum saw them. For example, on October 5 when Katherine had been called out to speak to Mr. Green, Mr. Callum asked her to respond to a question. Joanne brought up another dimension to the system's picture quality. One day (October 8), Mr. Callum thought Joanne was not in class but she was. She and I had both noticed that students with dark hair and wearing dark clothing tend to "fade into the woodwork", so to speak, when viewed from the other end of the system; Joanne's black hair and dark sweater may have caused Mr. Callum to think she was absent.

Mr. Callum found it difficult to see all of the Durham students at one time and as a result, he and some of the other PictureTel teachers had encouraged PictureTel's leasing company to find a wider angle lens, although he said "You're so used to that ... if I move the camera around ... then you can get everyone in" (I, Oct. 12, p. 23, T).

By the second interviews in October, most students seemed to be fairly accustomed to picture quality because they decided it was not the most essential element in their interaction with the other classroom. As Katherine said "You still notice it, sometimes ... you get use to it, like you realize it doesn't matter" (I, Oct. 8, p. 7, K). Joanne and Yvette also felt the quality of the picture was not important and perhaps to their advantage since Mr. Callum could not always see what they were doing:

> Well, we can't see a whole lot where they're doing kind of thing so you're kind of hoping its the same for us. Our camera's farther away also, too. And if you're not on the screen then it's, you know, safe if you're, you know, making faces at the camera ... (I, Oct. 8, p. 6, Y)

Melanie felt that her class had an advantage with two large monitors, each showing one classroom. Hillview had a single monitor showing the receiving classroom on the large screen and their own class was shown in a small rectangular frame at the corner of the

screen; this additional "picture in picture" could be switched on and off. She liked it better because:

> You can see what they're looking at better ... like if we didn't have the big screen, if maybe we didn't put the little picture thing on we, like they could zoom in on you and you wouldn't even know ... I always look to see what he's looking at ... (I, Oct. 7, p. 5, M)

Blackouts. During my observations, there were only two classes affected by blackouts. On October 6, we could hear Mr. Callum in Hillview but our screen remained blank. Valarie went to get the Durham principal to correct the problem. During class on October 15, Yvette was in charge of the keypad. She pressed the wrong button; we could still see the sending class but they could not see us.

Camera control. Camera control through the keypad was also another aspect of the technology. The Durham camera was controlled from the Hillview classroom and vice versa for the Hillview camera.

The camera's four pre-set positions could be programmed in ahead of time at each end of the system. Mr. Callum reported that this feature was not used because of the small groups of students in each classroom. However, the camera positions could not be locked in at either end.

Mr. Callum found his movement was restricted by the camera range which was controlled from the keypad. In a traditional classroom, he liked to move around the classroom and found the PictureTel classroom "like you're glued in one spot ... I don't deny that's a limitation" (I, Oct. 12, pp. 24-25, T). Katherine felt that if the teacher had been able to move more, the students would have been more attentive: "It never moves. Like usually a teacher in a room, they're moving and you kind of have to move with them ... with the T.V. there, you can sit there and lay there on your desk" (I, Oct. 8, p. 11, K).

Sound quality. Sound quality has been touched on previously and generated the most student discontent in relation to the actual technology of the PictureTel system.

Background noise was often a problem at both ends of the system. Several times as I observed at Durham, I noted a noise resembling a freight train off in the distance coming through from Hillview. When Mr. Callum was asked about this, he reported that

it was likely the power planer noise from the Industrial Arts room across the hallway. Generally, I did not find many other background classroom noises could be heard from Hillview when I was in Durham, perhaps because of their carpeted classroom and very stationary desk arrangement.

However, this was not the case when I observed the Durham classroom from the Hillview end. Sometimes there was so much background noise - desks scraping across the floor, voices murmuring - that I found it distracting as I listened to Mr. Callum. One day Mr. Callum asked the Durham students to close the door in an attempt to cut down this noise. The Durham classroom was uncarpeted and although the students generally arranged their desks in the cone shape, this pattern changed slightly each day and sometimes even during the class. For example, I noted in my observations on September 28 that as soon as Mr. Green left the classroom, Derek and Valarie moved their desks tightly together so that Joanne was hidden from Mr. Callum's view.

Voice clarity was a problem, but the Durham students largely overcame this, as Katherine described:

> You have to project. You have to be really loud and then sometimes you're way too loud and the other end goes [*holds hands over ears*] because the screen just yelled at them ... the mikes, I don't [know] if they are pick-up mikes or what they are but they pick up a lot of, like if the class is talking, if someone just leans over and says something it'll pick it up, but it's not clear enough, it just sounds like motion in the back ... So if your teacher is talking to you, you've got to try to ignore the sound there's an extra sound in there. (I, Sept. 7, p. 6, K)

Usually, the Durham students could not hear the Hillview students. Melanie said that she could hear Mr. Callum well but the Hillview students "not at all ... that's why he transfers most of the time because we can't hear them ... he asks if we can hear and usually we can't (I, Oct. 7, p. 4, M). Day after day, class after class, the Durham students asked the Hillview students to speak up or repeat and Mr. Callum often had to relay the Hillview students' responses (Sept. 2, 16, 20, 22, 30, Oct. 4, 15). Most discussion was relayed by Mr. Callum between groups:

> One thing that I need to remind them again is to make sure that they do speak up. Because I've had to re-phrase answers students in Hillview have

> given so that the kids in Durham have heard the comment ... The girls are very quiet. And that's why ... and I do that because we had found through feed-back that that's one of the things that the kids in the receiving site didn't like was that they weren't hearing the comments. And so they thought it was important that they did hear the conversation so, you know, so I try and get it back to them. (I, Oct. 12, p. 21, T)

After Mr. Callum's visit to Durham on October 13, he reminded his Hillview students repeatedly to speak up, look at the camera, and project their voice out because hearing them was a major concern for the students at the receiving end. In contrast, Mr. Callum reported that Hillview could generally hear the Durham students.

Valarie thought some of the problems with hearing the Hillview students were actually a result of the way the Durham classroom was set up: "it's not set up right ... it just echoes off the wall ... (I, Oct. 7, p. 3, V).

In the second round of interviews in October, I asked each student which was more important - sound or sight. All students were unequivocal in their answer. Hearing was more important than seeing. "You don't always have to see everything to learn from it" (I, Oct. 7, p. 4, V). When I asked Mr. Callum about the difference in voice clarity between the two groups, because his voice came through so well as compared to his Hillview class, he suggested:

> I think that there's maybe a hesitancy on the part of some of them to be heard. And I guess that's something that we have to overcome throughout the course of the class. And I think that if you watched or observed those same students in other classes you would see the same things. That this is not something new. That they are, they speak in that tone no matter what class they're in. And teachers have just as much difficulty getting them to speak up in those classes as we do in this one ... It's a personal thing. And it's just something to be constantly reminding them of and maybe it's the kind of thing where we're going to have to get them lapel mikes. And just to make sure that you've got people that are being heard. (I, Oct. 12, p. 25, T)

Like me, Katherine felt that:

> The guys pick up a lot easier than the girls because ... their voices are deeper ... probably the teachers even more so because they've been taught to project their voices so that everybody hears them. (I, Oct. 8, p. 7, K)

During our second interview, Mr. Callum mentioned the possibility of obtaining lapel mikes for both classes. He thought these would be particularly useful for students making oral presentations. In a telephone conversation in November, he reported that the leasing company's technical person had found an FM lapel mike that seemed to have excellent sound quality and the added bonus of allowing the teacher or the person wearing it more freedom of movement, at least within camera range (I (telephone), Nov. 19, p. 2).

Personal appearance. The students' reactions to their personal appearance on the monitor were varied. Katherine laughingly responded that they would all be like "news reporters ... or news anchor for T.V." (I, Sept. 7, p. 6, K) by the end of the class. In contrast, Joanne really disliked being on screen:

> The reason I don't talk very much in class is 'cause I'm really shy of the camera and stuff and I don't like talking in front of all those people. Especially people I don't know, and so, like I don't like saying my answers, they'll all laugh. I'd rather get together and actually get to know each other as a class, 'cause I feel, because they know Mr. Callum ... I don't like talking in front of people I don't know. And I don't like the camera either. (I, Nov. 8, p. 5, J)

She felt hearing the other students was more important:

> I'd rather just have a microphone ... if you could hear them clearly, you could know what they were talking about ... like if he asks them a question and we can't hear them we don't know what they're talking about. It doesn't really matter what they're looking like. It'd be easier if we could hear them. (I, Oct. 6, p. 5, J)

Valarie thought that a set seating plan might be a solution to some of her classmates' avoidance of the camera:

> Where they can be seen at all times. But I know some people, a lot of people have a problem with the camera being on them, but they've got to get used to that, too. They can't shy away from that all the time. (I, Oct. 7, p. 15, V)

Mr. Callum also noticed some of the Durham students' avoidance of the camera:

> You can tell that by when they're doing a presentation or you're talking to kids and move the camera on and focus in on the student and immediately the head goes down or the hand comes up in front of the face. And I think

> those are the same growing pains that the kids went through in [third PictureTel school] or Hillview the first year and I guess Durham just has to work through those and know that with time they will become less of a concern for the kids ... Yvette wasn't phased by the technology, Katherine wasn't phased by the technology. Bruce and his article (laughs). I mean he wasn't, you know, the technology really didn't bother him a whole lot. But there are others you can tell that, you know, ... are very hesitant, they're self-conscious about being seen on the camera and would rather not be deemed the focal point ... when they're going to do a presentation or when you have to ask a question ... So I think that it is a matter of some adapting to it right away and others it's going to take time. (I, Oct. 12, pp. 4-5, T)

Keypad. Through my observation of the PictureTel system I noted that the use of the keypad brought up the issue of power and control in each of the classrooms. The keypad is a flattish, rectangular box that, in the simplest of definitions, controls the sound volume and the camera. I did not get a chance to talk to the participants about the keypad until the October interviews, but sprinkled through my field notes were many references to it. Sometimes the Durham students, usually with Derek or Yvette in charge of the keypad, scanned the other classroom, brought in close-ups of Mr. Callum or one of the Hillview students. One day, Yvette, as mentioned previously, caused a blackout of the Durham classroom for the other end. When I observed at Hillview, I wondered if these students realized how well the built-in mike picked up their sounds. Whenever Derek tapped his pencil on the desk next to the keypad, it sounded like a drumbeat at our end. However, I did not realize what was causing the noise to begin with because the picture image was not clear enough for that detail (O, Sept. 24, p. 66). After the second interview, the students did not make as much noise, perhaps because I had raised their awareness about this aspect of the technology.

Katherine thought that a student controlling the keypad was "a power thing ... it's a 'ha, ha! Let's zoom in.' Zoom! and they do it and did everyone see that!" (I, Oct. 8, p. 20, K). She wondered if the teacher could turn off the Durham keypad because:

> I find it annoying because every time you focus on one thing and all of a sudden you focused on a Hillview school boy over there in the corner who's making an idiot of himself and I'm going, "No guys, go back to where I want to be." (I, Oct. 8, p. 21, K)

Yvette, who controlled the keyboard frequently, was quite amused by its potential to cause embarrassment. She also brought out another dimension of control: "Mr. Callum just can't hear us that well 'cause if you turn off the mike on the control pad, he can't hear us that well and can't see what's going on really" (I, Nov. 8, p. 4, Y). Valarie thought Mr. Callum realized what was going on but "there's some things he can't see ... I think he sees most of it and doesn't comment on it" (I, Oct. 7, p. 14, V).

When I asked Mr. Callum about the keypad, he explained that he encouraged his Hillview students to get used to operating the technology so they would not worry about it and also to give him more freedom:

> What I tend to do is that I'll ask [a student] or whoever is sitting there. I've asked _____ at times, you know, "_____ just focus in on this person, or zoom it in, or move it around a bit." Them doing that frees me up to keep, ... by getting some of the students to do that it's just one less thing for me to worry about ... (I, Oct. 12, pp. 21-23, T)

I mentioned that only two students seem to run the keypad in the Durham classroom, but perhaps other students had an opportunity as well. He replied "they probably haven't ... I don't know if Bill Green has done something specifically with them. I mean I haven't" (I, Oct. 12, p. 21, T).

Teacher Expectations

The course outline and teacher expectations have already been described in the context section. Mr. Callum had a clear notion of what he expected from his Law 30 students:

> At the far site, to make sure that if there's something they're not clear about, to take the initiative and ask. Because if they don't do that, then I'm proceeding on the assumption that they understand and really know it. And so it's, I guess that becomes part of the equation that I believe they have the responsibility for. Because I'm not in that far site. And that's, you know, I think no matter what distance learning you do, whether it's correspondence, or this method, or whatever that they have to take some ownership for their own learning. And I think that's the other critical part of it that I have found some difficulty with ... It changes the expectations and I think we are changing the role of students through this kind of distance education. I think traditionally the students have been satisfied with having the teacher being the fountain of all wisdom who stands at the front of the room, gives them all the information and it's like taking that information and pouring it out of

> a pitcher into a funnel, goes into their ear and they've absorbed it all. And that's as much as they want to be involved in the learning process. And now we're asking them to do some things which I don't think would really be a hardship for them, but maybe are different than what they've been accustomed to do. And I think that's maybe why there's been some frustration with it ... Some can adjust to it quicker, others it takes time, and some just don't. Because they're asking them to change the way they are as a person. Maybe they're a quiet introvert and having to be outgoing or talkative is maybe something they really have difficulty with. (I, Oct. 12, pp. 1-2, T)

He also recognized that different school norms affected how students responded to the teacher's expectations:

> When you're dealing with, really three schools, at times you're dealing with maybe three different ways they look at dealing with students in terms of discipline, grading, whatever, so that some things that are allowed in some schools are not allowed in others. And you've already seen some of the times I've had to ask them all "is that what is the norm up there?" because that may be something different than what we do here. And we try to make sure that we're on the same wavelength when it came to expectation for the students in all of the sites. (I, Oct. 12, p. 3, T)

By the last week of September, Mr. Callum was visibly angered by some of the Durham student's lack of preparation for class. For example, he had stated clearly on the first day of classes that he wanted students to read assigned readings before classes. Some students were not doing this. Absent students were also held responsible for finding out what they had missed.

The news article assignment caused him the most grief. He expected the students to submit a neatly written or typed copy as well as making a presentation to the class that could be used to generate discussion. The presentations usually went well and students in both rooms did have questions and comments for the presenter. However, he had to remind Durham students to stick to Canadian articles especially after Bruce, a Durham student, gave a riveting presentation about the American man who had his penis cut off by his wife. After this, the students did stick to Canadian stories. In his second interview he mentioned that the Durham students were doing poorly on the written part, worth half of the total marks, although the Durham students were contacting him in advance to discuss their

presentations which he had encouraged them to do.

Student Approaches to Learning

The receiving students had various approaches to learning the Law 30 content. Some students were certainly more successful than others. There were also many contradictions between what students said they did and what I actually saw them do. They all agreed to let me look through their binders at the end of my six weeks of observations.

Katherine found that for her personal learning style, it was important not to miss doing her readings:

> Because then you're really lost, like I mean really if you're going to be lost and you don't understand the material anyway, if they go over it ... if you think you can skip the whole chapter ... then forget it. (I, Sept. 7, p. 6, K)

She made few notes, but highlighted important sections of her readings:

> I read it over. I don't know if I read funny or what, it takes me a long time to read but once I read it stays with me ... I have if points are stressed or points that I thought were important [gives example of section on appeals to Supreme Court of Canada]. I do use highlighter instead of writing out of my text. (I, Oct. 8, pp. 13-14, K)

Katherine enjoyed the application component best in Law 30 rather than answering questions out of a text. As other students made their presentations, she would "think how I would do that one if it were my presentation" (I, Oct. 8, p. 17, K).

Mr. Callum saw Katherine as a self-starter; someone who had a "good work ethic", good organizational skills and was motivated to take an "active role in the learning process," "there is no problem learning over this technology" (I, Sept. 2, pp. 8-9, T). He felt that considerable academic ability was required to do well in PictureTel classes such as Calculus, but for electives like Law 30 these student characteristics were sufficient.

Joanne took a much more passive approach to her learning. When asked how she would go about learning something now she replied "I don't know, I'd just sit back and take in what I could" (I, Oct. 6, p. 2, J). When I checked her binder, I found that Joanne actually made more notes from her readings and the class than she said she did. For her upcoming news article presentation, Joanne planned to:

Ask Katherine about it because her's was really good. I'll see. I think I

> have, I know an article I want to do it on already ... Katherine seemed pretty pleased with her presentation, about her mark and stuff. Melanie didn't like hers, like she seems to think that he might have docked 10 marks because it was a U.S. story. She didn't do very well on it. (I, Oct. 6, pp. 9-10, J)

Generally, Joanne underestimated the amount of work she did for Law 30 even though her efforts were not always reflected in class.

Yvette, Melanie, and Valarie made statements about the amount of work they did for Law 30 that was not evident when I checked their binders. Yvette reported that for her readings she "just read them, once in a while with definitions, I'll write down definitions, but that's all ... I've been underlining with my red pen" (I, Oct. 8, pp. 8-9). However, when I checked her binder on October 21, I found no notes or underlining of any kind.

Yvette made one of the best news article presentations, but she went about her preparation in her usual, shrewd, and time-economical way:

> It didn't take me too long. I saw the article, what the article's about I saw it on the news two nights ago, I think, and so I looked in the paper yesterday to see if the article was in there. 'Cause that's what I've been doing, is kind of been watching the news and waiting for an article to pop up. And then I found the article and it didn't take me very long. (I, Oct. 8, pp. 9-10, Y)

Melanie exaggerated her level of effort in our second interview: "And we don't really read, we take notes and then you have something to study from ... I put down a few definitions, like eight or so, but that does it" (I, Oct. 7, p. 11, M). I found no evidence of this when I checked her binder two weeks later.

Perhaps Melanie was more honest about her work habits in our final interview in November as illustrated by this excerpt:

I. How much time do you spend working on this class out of class? Just an estimate in a week.

M. None. (laughs)

I. None. Absolutely none?

M. Not usually.

I. Ok. What about exams?

M. Studying for them?

I. Mmhmm, mmhmm.

M. Um, not too, probably an hour, maybe not even. I don't really study for it. 'Cause I don't want to be there and I don't want to take it, so ... (I, Nov. 8, p. 3, M)

Although Mr. Callum had discussed in class and given out a two-page handout describing the expectations of the news article presentation, including the mark allotments (half for written part, half for presentation), Melanie was angry about how she had done:

> I found an article in the paper, then I researched, like I didn't really research it much, but. And then I just pulled out the main points and answered the questions that he gave us. And read it over a couple of times, corrected it, read it over, read it out loud a few times, and then ... he didn't make it too clear to me when he told us to do it. Like he did not emphasize a Canadian issue ... I only got 12 out of 20 on it ... Like when I got my thing back he just went on and on and on and on about what was wrong with it. He said nothing good about it. And he marked me on stuff he didn't even say he was marking on ... Like he marked me on my writing. My, well I can see spelling, but it was an oral presentation, it wasn't a written one. We read it. Therefore he should be marking on your presentation and how you went about doing it, not how you wrote it out or anything. (I, Oct. 7, p. 12, M)

When Mr. Callum gave the students the evaluations of this assignment he included an additional page of typed comments, usually two or three paragraphs in length.

Valarie sometimes did not do what she said she did: "Well, when we go over our reading in the class, like the main points he says out of that, I just highlight it and after that I write them down" (I, Oct. 7, pp. 7-8, V). She had done some highlighting of her readings in her binder, but there were no notes.

Student/Teacher Dynamics

Mr. Callum's relationship with the two classrooms was different. Generally, his interaction with the Durham students lacked the warmth apparent in his dealings with his Hillview students. During my Hillview observations, and before we connected up with Durham, there was always some talking and teasing going on between him and his students present in the room, particularly with the two boys. The only day I saw the same degree

of warmth between him and the Durham students was when he came to visit their class on September 8. Mr. Callum's strong, but often humorous manner, had the Durham students relaxed and listening closely to what he had to say. For the next two classes, even though he was back in Hillview, the Durham students seemed to be more engaged with his lesson than before the visit. The two groups laughed together rather than at each other. However, this feeling faded away as the days passed.

Each Durham student commented on their relationship with Mr. Callum.

Katherine felt that:

> It's a very different relationship like it just seems that he doesn't really know any of us. Because other than in that class, we have no interaction, like when you go to school just on a regular basis you see your teachers after school or in the hall ... it's very much a working relationship. (I, Oct. 8, p. 3, K)

She made sure to contact him when she was preparing for her news article presentation for a rather cynical purpose.

> I phoned and asked him a couple of questions ... Yeah, because they want contact, they want contact ... "Oh gee, maybe I better give her a couple of extra marks." I don't know if that's how it works, but ... (I, Oct. 8, p. 15, K)

Katherine also felt that "right now is we feel kind of picked on. Like I know I feel it all the time, why don't you ask your students to answer the question, instead of us, us, us" (I, Oct. 8, p. 21, K).

Joanne also felt picked on:

> He doesn't really talk to us. Like he just picks on me. He asks questions all the time from <u>me</u> ... Like he thinks I'm stupid or something. 'Cause he thinks I don't pay attention, but I actually do. I'm always paying attention. (I, Oct. 6, p. 11, J); It's hard because you can't really ask, like when you see a teacher after school, "Oh, can you help me with this?" and stuff. And he says, like you can link up and stuff, but that's just too much of a hassle ... But if you're just, like if you were sitting there working on it and he walked in the library, "Oh can you come here for a second?" and they'll help you. (I, Oct. 7, pp. 9-10, M); Well maybe like I can see if two or three of us were having problems we would probably link in but one on one I don't think I would or anything. (I, Sept. 7, p. 5, V)

Mr. Callum encouraged Durham students to phone him if they had a problem.

Yvette suggested the first term report card marks may have encouraged the Durham students to listen more:

> More people are, I don't know, some people are paying more attention and some are mad because they got a bad mark. 'Cause they're just not listening at all, kind of thing. But, there's about four of us, well my mark was, I got a 70 something in mine. So I was happy with that, but I started participating in class before that, so. (I, Nov. 8, p. 2, Y)

Mr. Callum also acknowledged that he felt more comfortable with his Hillview class.

> I've got four kids now in Hillview and I have been pleased with the kids that I've got in Hillview because they're all new to me as well and they're not, maybe, as strong a group as the ones I've got at the other end, and yet they have performed very well. They have asked some very good questions, they've done, for the most part, very good jobs on their presentations which shows to me that they're taking some of the responsibility for themselves and their learning ... maybe the fact we're a small little group, you know, sort of builds itself to that. And they get along well together. We tend to be pretty informal, even though I'm the principal, you know, the four of us ... we're more of a group. (I, Oct. 12, pp. 14-15, T)

All the Durham students felt that Mr. Callum paid more attention to their receiving classroom and suggested reasons why this happened. Katherine thought it was because:

> It's new and they're not use[d] to focusing on both classrooms ... like in a normal setting you're focused on one class ... you focus on what's in front of you but because of the P.T. [PictureTel] they're thinking about, "Oh I wonder if these people are understanding, because I'm not there in front of them because I can't see their faces and say, you know, that look on their face, you don't understand" ... so I think maybe that's why. In the back of their head "my class is here, can always stay after school if they don't understand it but that other class may not understand. (I, Oct. 8, p. 5, K)

Yvette saw Mr. Callum's focus as a way to keep Durham's attention:

> If he just sits there and talks to his class and wants us to listen to him, it's not going to work very well. So if he pays more attention to us, then it seems like maybe we'll be paying more attention. 'Cause, he's there <u>with</u> his class. (I, Oct. 8, p. 2, Y)

Joanne, who was taking another PictureTel course from the sending end, felt that

there was a natural tendency for the PictureTel teacher to pay more attention to the receiving class. Joanne said that her Psychology teacher spent more time talking to the receiving end. Mr. Callum acknowledged that this might be true.

> At times I tend to maybe not focus as much attention on my students here in Hillview and I have to remember that they're part of the class too, and to direct questions at them. And, you know, I tend to be focused on that T.V. a lot ... (I, Oct. 12, p. 6, T)

Student Interaction

The Durham students' reactions to their classmates in Hillview were varied. When Mr. Callum made his first visit to Durham, he cheerfully mentioned that several dating couples had met over last years PictureTel classes. The students seemed to be quite amused by this idea, particularly in view of the rather blurry image being received from the other end. However, the dating idea--meeting new classmates--might have considerable appeal to high school students in a small high school where in-school dating choices were limited.

Katherine and Valarie had a stand-offish attitude toward the Hillview students because of what they felt was the traditional rivalry between the two schools. Melanie and Joanne, on the other hand, had met their Hillview counterparts at local dances and rodeos and had liked them (I, Oct. 6, p. 7, J).

I had always wondered at Joanne's in-class behavior. She seemed rather inhibited when it came to talking over the system and even bashful if the camera brought in a close-up of her. As she said herself, in a traditional classroom "it wouldn't bother me answering" (I, Oct. 6, p. 14, J). Normally she was a very lively teenager. The mystery of her behavior was partly explained by her, but mostly by her friend, Yvette. I asked Yvette about this in her interview two days later:

> Y. She's [Joanne's] complaining about Hillview people over there. Because she's had trouble in Psychology class, too. With people zooming in on her so she's, "There it is <u>again</u>!"
>
> I. So she's a little testy about that?
>
> Y. Yeah, 'cause in Psychology class, she's gotten in a little bit of trouble because they're always zooming the camera in on her, 'cause the kids that have it, and there's no supervisor in there at all. So, and they're always

playing with it ...

I. Is that why Joanne hiding behind her hair?

Y. Mmhmm.

I. Ok, because ...

Y. And that's why she doesn't want to be in the picture because they always zoom it on her.

I. So that's why you guys are moving together behind her?

Y. Yeah, and like, that's, they'll zoom in and then they'll move over, and so she'll just sit there and look at them, 'cause Psychology class is really bad I guess.

I. Maybe those guys are interested in her?

Y. Yeah, they are. (laughs) Well one of them wants to go out with her, like thought she wanted to go out with him.

I. Oh, I see, I see.

Y. And she's also ...

I. Well that explains the mystery.

Y. Yeah. (I, Oct. 8, pp. 13-14, Y)

In my field notes for October 6, I noted that "Hillview student makes his presentation, dealing with casinos on reserves. Durham students, Joanne and Yvette insist on getting a close-up of this student" (O, Oct. 6, p. 109). I asked Yvette about this, too.

I. I did notice that on Wednesday that when ____[presented] now _____ is the quite good-looking one, isn't he?

Y. Yeah.

I. I noticed some real interest on the right side of our classroom.

Y. The right side? Where we were sitting?

I. Mmhmm.

Y. Well I think she likes him but she won't say anything.

I. So we're still sort of at the hostile stage?

Y. Right, yeah, yeah. She's, like, "Oh God" and I missed his presentation and they had a close-up on him and she went, "Yeah you missed the close-up of ____" and I went, "Wooo!", sorry. But yeah, I think she, because she's the one that draws my attention, like, so was there any good-looking guys in our Law class and she goes "Wasn't _____ in our Law class?" and I go, "Ok." 'Cause that's from the day we went there she was showing him to me. (I, Oct. 8, pp. 14-15, Y)

Clearly, there was some informal student interaction going on through the system. I even felt after my conversation with Joanne, but before I spoke to Yvette, that Joanne was being harassed somewhat by the Hillview boys controlling the camera.

Mr. Callum also noted the interest between Joanne and the Hillview boy "I think there's a certain degree of checking [the boy] out. I'm quite sure of that" (I, Oct. 12, p. 24, T).

The Durham students still saw the sending and receiving groups as two distinct classes when they were interviewed in October. They did not really think this would change "because we don't ... well, talk back and forth to each other" (I, Oct. 7, p. 19, M).

Mr. Callum agreed with Durham students and felt in October that they still felt "at a distance" when I interviewed him in October.

> I would say that they're still distinct groups. That's my perception. And my goal, I guess, by the end of the year is to say we are one class. Because in reality that's what we are. We are one class. And yes we're 60 miles apart, but we are one class working in the same subject all working toward the same goal. And that if, by the end of the year they will have understood that and believed that, yeah, I think the year had been successful. (I, Oct. 12, p. 30, T)

By our November interview, he had some specific ideas about how he could improve the working relationship between the two groups, even though he perceived some unwillingness to do this among the Durham students:

I think it's important because I think then they'd feel a little bit more

> comfortable with talking to those people and feeling that they are one group. And there are some things that we're going to do when we go on our field trips where we're together as a group. I just find that the kids there don't seem to be as willing to get to know the kids here. That's my perception ... Well, I guess I'm going to force them, where they're going to have to do some things together, where they're not going to be in two groups. I'll partner them up maybe a with a kid from Hillview and a kid from Durham and say, "Ok, your responsibility is to work on this jointly." And that may be something where what I'm going to do is pair them up with a kid from Hillview and a kid from Durham and say, "Now you're going to do a joint presentation and you're going to have to get together at noon or before school or after school and make up and co-ordinate amongst yourselves how you're going to do this." And that's again going to force them to have to work together ... Yes, and it's got to be uncomfortable talking to one another, but I do know that that's going to be something to work at because when they [Durham students] went on that SRC thing, they didn't even socialize with any of the other [schools] ... They were just a little entity to themselves. (I, Nov. 9, pp. 10-11, T)

Off-task Behavior

During my observations in Durham, I noticed many examples of student off-task behavior. These included tossing objects at other students, writing, passing, and sharing personal notes, writing letters, reading texts for other classes, pushing and shoving and playing "footsies" with each other, talking and giggling among themselves, resting their heads on their desks, and even playing with each other's hair. On days when there were interruptions such as the yearbooks being passed out, all the students were distracted from the lesson. In my field notes of September 20, their behavior was so bad, I wrote that "I was torn between trying to be an observer in the class and wanting to step into my teacher persona and straighten out the disruptive behavior ... I'm glad I'm going to Hillview on Wednesday" (O, Sept. 20, p. 40). The students gave me many reasons for their behavior. Katherine said:

> It's definitely easier to sit in receiving classroom if you don't want to work because that camera is never focused on anybody and it's generally focused on one spot and everyone knows so if you kind of sit ... I can sit and do homework in that class and if he asks me what am I going to say, "Gee, I'm taking down what you are saying," what's he going to do about it, he can't prove it yes or no. (I, Oct. 8, pp. 6, 8, K)

She found that it was hard to pay attention continually "because of the lack of clarity ... it's so easy to clue out ... the system is boring, there is really no other way to phrase it, it's boring" (I, Oct. 8, pp. 11, 18, K).

Joanne and Yvette said they exchanged notes when they were bored. I asked the students what these were about. They said they were about other students and their weekend plans. Yvette had also made some observations about off-task behavior at the receiving end of her other PictureTel class:

> Yeah. Um, like we notice if somebody in the receiving end is doing something. But the teacher never usually does 'cause he's either paying attention to us or that he can't do it at the same time. And even for us when he's paying attention to [receiving class], like I notice more people in our classroom goofing off because he can't pay attention to both of us at the same time. (I, Oct. 8, p. 3, K)

She suggested that grade twelve students should perhaps be better behaved. Yvette also thought Mr. Callum might have more control:

> I hear all my classmates complaining, you know, "Gee, all the reading we have to do," and all this stuff, but if they sat in class. Like I can do two things at once, I can listen to Mr. Callum and sit there and write a letter to somebody and go and read it [the required reading] and it'll make sense to me because of what he said. But lots of people in our class sit there and talk and then they go and read it and they don't understand it, so it'd be nicer if he had better control of the class. Like you know Grade 12 students should be more ... but felt this would not work anyway because "he can't see what's going on." (I, Oct. 8, pp. 10-11, Y)

Melanie and Valarie wrote when they were tired or bored in class. Melanie said "I usually write a letter to one of my friends ... or do some homework out of another class" (I, Oct. 7, p. 17, M). Valarie thought the situation could be improved by having a teacher in the room who could answer questions.

Seating Plans

I wondered if there was need for assigned seating plans in the receiving classroom and asked the participants about this idea. Valarie thought it would be a good idea (I, Oct. 7, p. 15, V). Mr. Callum disliked the idea:

> I think it's a little ridiculous that one should have to worry about who one sat next to at a Grade 11 and 12 level. Because if they're going to spend

> time talking instead of working and to make the point to them, what do you want. And show some maturity and some responsibility and tell me that you can operate where you're sitting without me having to say, "Well aren't you there?" and this one here and that one ... I don't really need the seating plan in the sense that I know them all now by face and name. And, you know, so ... It would be a classroom arrangement. It wouldn't be because I didn't know the name or didn't recognize the person. That' I've got down. It would be more classroom arrangement ... I mean at that level to tell [student] that she can't sit next to a person because you're going to spend your time talking, it says more about them than it does about the classroom itself. I mean, if I have to do it I will. (I, Oct. 12, p. 19, T)

Discipline

I wondered if Mr. Callum had considered the question of discipline over PictureTel. He had:

> If there are some kids that may be a problem, what I'll do is talk to those kids, what I'll do is after the class is over, uh, because normally I would take them out of the room ... I would tend to say, "I want so-and-so to stay and the rest of you can go" and then talk to them over PictureTel and say, "Look, if this were to happen again, my next step would be to have a meeting with you and Bill and come to some conclusion as to whether you are staying in class or you're relocated to some other spot. (I, Sept. 2, p. 17, T)

The administrators of the three PictureTel schools had decided to adopt a team approach to discipline for consistency. This was adopted before the PictureTel classes started.

However, Mr. Callum did not anticipate a lot of discipline problems because:

> Probably because kids react differently to me because I'm the principal ... they might look at me as a teacher but the reality is, uh, I'm the administrator of the school and when they come to Hillview they're dealing with the boss. One of the other advantages is that Bill and I pretty much think alike when it comes to discipline, and what we're going to tolerate and what we're not, so that we're on the same wavelength ... So that's the advantage is that all of the kids are going to know what we will accept and what we won't and they'll know that if it's my kids here in Psych that are goofing around, I'm going to step on them and I know that if they're being toads in Durham, then all I have to do is talk to Bill and they're going to get an earful. (I, Sept. 2, p. 17, T)

Although no Durham students overtly challenged Mr. Callum's authority while I was

there, they had a somewhat different point of view. Katherine thought:

> He basically has no control because he's not there ... I mean if he starts yelling and you could probably turn it down ... I think if something like that ever happens, they'll just get pulled out and have to go down and see Mr. Green. (I, Oct. 8, p. 6, K)

Both Melanie and Joanne felt over-supervised by Mr. Callum. "If he can't see us, we think we can get away with stuff and he doesn't want us to think that, so he's always asking what's going on and moving the camera around and stuff like that" (I, Oct. 7, p. 2, M). However, they thought Mr. Green would be brought into a situation involving discipline. Yvette also thought he would need back up from the Durham administration because "it just doesn't seem too scary from Hillview" (I, Oct. 8, p. 4, Y).

Mr. Callum perceived that some of the Durham students' discontent stemmed from past tradition:

> I think that was part of the thing that played into the bitterness of some students toward PictureTel, not so much PictureTel, but toward Law 30, is that they were now having to take a class that they really didn't want to be in. But because they have to take a full load, they have no choice. And I guess my perception is that the kids here in Hillview, this is not new to them, they've always had a full load. And they've adjusted ... they're not bitter because they're having to pick up an elective. I mean, they've always wanted the electives. And now we're offering them electives at Durham that they've never had before, but now they're angry because they want their spares. Well, I think you could make a very good case to support why you want students to take a full load. I think you'd have a lot harder case to defend why they need spares. (I, Nov. 9, pp. 14-15, T)

Immediacy

A major factor in Wheatbelt School Division's choice of PictureTel was its perceived advantage of immediacy, when a teacher is able to respond to a student without delay.

> The big advantage that we perceive is that PictureTel involves immediacy between the student and the teacher, that the teacher can see the student, the student can see the teacher in the sending site and if they have a question, ask immediately. There's that kind of immediacy that's not there with SCN, where a single feedout and maybe at some point in the class at the end you can call back. Well, I know that when the board looked at all of the distance ed possibilities that were out there, that was the thing that turned

them off with SCN. (I, Sept. 2, pp. 10-11, T)

However, I did not always see evidence of immediacy in class. Six weeks into the course, Mr. Callum was finding this one of the biggest differences as compared to teaching in a single classroom:

> I guess one of the biggest differences is you're not always able to see or tell at a glance what they're thinking or feeling at the other end, and whether they've really understood something or they haven't ... Whereas when they're all in the class there with you, you can pretty much get a pretty good gut reaction based on some questions that you've asked or the looks that you get as to whether they're with you or they're not with you. And you don't quite have that same, uh, feeling,
> uh, with the kids being in Durham. (I, Oct. 12, p. 1, T)

Adult Presence

All the students had a real desire for an adult presence in their classroom. Perhaps Yvette summed it up best when she was asked what changes should be made:

> Well, the PictureTel is fine and everything, but people in our class, like I was like that at the start of the class, it was 'cause there was no teacher in with us, so we could do whatever we wanted. But now, I'd like to have a supervisor in there or somebody. Just so that the class would settle down. 'Cause half the time you try and answer the questions and talk with him and everybody else is making noise. So it would be nice to have a supervisor or somebody to pop in every once and a while. (I, Nov. 8, p. 3, Y)

Mr. Callum did not agree with the need for supervisors:

> We used a teacher when we first did PictureTel ... you couldn't run it any other way, you had to have a supervisor there ... But I really don't think you need a supervisor if you always run it by having the receiving school having the smallest number of students ... If they were to get larger, and I think we've kind of made the commitment that we will not go beyond having 20 students total in a PictureTel setting. So you're not dealing with really big numbers ... The only time I perceive needing a supervisor is when I've got an exam. (I, Oct. 12, p. 17, T)

He felt the reason the students did not like being without an adult was:

> Because they have experienced 11 or 12 years of constantly being supervisor and now you're asking them to make a totally different switch into how they've been dealt with ... they've got to take some responsibility on

> themselves and it's like it's this umbilical cord they've been attached to for so long and now it's severed. They've got to function on their own. (I, Oct. 12, p. 18, T)

Teacher Questioning

Effective teacher questioning has always been an important element of good teaching practice in any type of classroom. In the Law 30 receiving classroom, Mr. Callum used questioning to check for understanding and to expand student answers, as well as attempting to keep the students' attention. With the limited sight and sound capabilities of the PictureTel system, questioning was especially important to the teacher.

However, the students often tried various avoidance strategies for responding to his questions if they were not prepared for class or they were not following the flow of the lesson. Comments like "Would you repeat the question," "I don't know" or "I agree with ____" were common Durham student responses. Mr. Callum usually continued to probe for answers when this occurred.

> Well, I guess sometimes you go back and you may want to think about giving them a question that is less threatening, that is a higher success question, you know they have the potential to answer it and there not being a right or a wrong. And that if they can get a little more comfortable by giving them those kind of questions, then maybe they'll feel less threatened when, you know, your questions to them involves a little more challenge, and deeper thought. (I, Oct. 12, p. 9, T)

He did not see this as a new aspect of PictureTel teaching: "I don't think there's anything new, or, that I would, you know, I think you'd use the same kind of procedures as you would in a regular classroom." (I, Oct. 12, p. 9, T).

Katherine usually had little difficulty answering his questions because she was prepared:

> Yeah, like they are not hard questions and you know you have an opinion and it has to become a goal saying "This is my opinion." So often when you read something he wants you to form an opinion on it and be prepared to back it up. You have to be comfortable in a group situation. (I, Oct. 8, p. 18, K)

Joanne, as described previously, admitted that she often felt uncomfortable answering questions in front of the Hillview class. Melanie told me she usually did not know the

answers, but "you don't want to look dumb" (I, Oct. 7, p. 17, M) so she would ask him to repeat the question or she would paraphrase another student's answer. Yvette found that Mr. Callum's questioning was confusing. "Sometimes when he talks for a length of time and all of a sudden he pops a question in there and you don't know when the question started even if you were paying attention kind of thing" (I, Oct. 8, p. 12, Y).

Examinations

Mr. Callum gave one exam while I was observing in Durham; the procedures for writing this exam have already been described. Later on, he gave the students a rewrite exam. Yvette described the tests and why she did better on the second one, after failing the first:

> His marking in the first test we had, he didn't put down what each question was worth. Everybody was mad about that. But then he was giving us a rewrite and we got to take the highest mark out of the two. So that was fine, and he said he'd change it around for us ... 'Cause I did, I studied for it but I still wasn't prepared for what kind of test he was going to give, but now. 'Cause the second test, was a little different than his first one. It was more application than it was defining and stuff, the second one. I liked that one better, too. (I, Nov. 8, pp. 2-3, Y)

Mr. Callum also felt the first exam had been poorly set up, but that some students still had not prepared for the rewrite:

> I guess I was disappointed because I'd given them the rewrite and I felt that was a very fair exam, the rewrite. The first exam ... was not fair in the sense that I had previously told them to expect something other than what they got. And even with that, some had done well. But the second exam was not a difficult exam, those questions were open ended. And if they did any amount of work, they would have done well. People who I had expected to do well, did not. You know, people like Yvette had a 72 on that test, Joanne had a 58. No excuse for a 58 for her, none ... Melanie a 40. I know she showed you the test, just no effort. Katherine, 96. She came to me after and said she really should have had a hundred. And I said, "I'll go back and check and if I've made an error, I will change your mark. (I, Nov. 9, p. 4, T)

He told the students that they needed to:

> Take what you know and apply it to another scenario. And the law being what it is, that sometimes I'm not always looking for what you could

> perceive as the correct answer, but if you could give me a credible argument why you think this case should be handled differently, then based on the argument that you give me, I can go and give credit for that. You know, it's no different than a judge who's looking on both sides of an issue ... Why are you making this claim? How are you defending it? How did you come up with that reason? How are you going to support that decision? (I, Nov. 9, pp. 5-6, T)

Perhaps in response to student pressure, Mr. Callum had reviewed more with his Durham students before the second exam.

> On Friday when I couldn't link up what I did was I sent them 10 questions that are just questions that they can use to check that they've understood the readings that we've done to this point in time. And as well, I gave them two sample questions of what they could expect on this test on the Charter of Rights and Freedoms. Where they were given cases that they would have to do. (I, Nov. 9, p. 6, T)

Report Cards

Student report cards came out in the first week of November, division-wide. The first term Law 30 were based on their exam and news article presentations. Katherine had done well as mentioned previously. Although Yvette was pleased with her mark in the 70% range, she felt she could do better next term. She mentioned that Joanne and Melanie were "mad that 'cause they got a terrible mark; might as well just forget it and fail the rest of the year" (I, Nov. 8, p. 2, Y). Valarie, who had been fairly patient with Mr. Callum and the PictureTel system to this point, had done poorly on the exam and was starting to blame him and the system:

> Well all three of my PictureTel classes were the lowest marks on my report card ... I know all of the Law marks were low. The Psychology marks, they weren't bad. And I know all the G.T. marks were down again. But since that, since our G.T. marks were down, Mr. _____ had help sessions for everybody, but Mr. Callum hasn't yet ... He, we're not having any help session, but he's giving us case study questions to work on and stuff, so. But that was only after talking to our parents. Like, he didn't do that on his own after seeing the marks. (I, Nov. 8, p. 4, V)

However, by the time I spoke to Mr. Callum by telephone in late November, he had decided to have noon-hour "help" sessions over PictureTel for the Durham students in preparation for their next unit exam. He was interested to see what the actual attendance

would be for these sessions (F, Nov. 29, p. 45).

Parent-Teacher Interviews

When I asked Mr. Callum about the arrangements for parent-teacher interviews of the Law 30 receiving students, initially he replied that this was:

> Not a problem because we've conducted parent/teacher interviews over PictureTel. Um, I'll be checking with Bill and seeing if there are parents who would like to talk to me about Law or there may be some parents up there that I might want to talk to about their child's performance in Law 30. (I, Sept. 2, p. 16, T)

In the end, the first term parent-teacher interviews were held in Durham when Mr. Callum brought his volleyball team over to compete in a tournament. Katherine and Joanne's mothers and Valarie's parents attended the scheduled interviews, but Melanie and Yvette's parents did not.

The teacher and five students described in this section provided many interesting perceptions about teaching and learning in a class where compressed video technology was being used as a distance education medium.

REFLECTIONS AND SUGGESTIONS

Reflections

Countless issues were generated in my study of the teaching and learning process in the Durham-Hillview Law 30 class using compressed video technology. I found it difficult to find the themes that would encompass all the study's findings. However three significant themes emerged. The first theme is that the teacher experienced a loss of immediacy or withitness with his Durham students as a result of the distance education medium. Secondly, the technology not only affected the relationship between the teacher and his Durham students, but limited interaction between the sending and receiving students as well. Finally, the technology and problems of interpersonal interaction made additional demands on the teacher and the students. The themes of technology, interpersonal interaction, and the additional demands on the participants seem to be facets of each other within this distance education context.

Technology

The PictureTel equipment was intended to replicate the regular classroom situation

as closely as possible. The ideal was to have the teacher and students see and hear each other and to interact, even at a distance. In reality, the teacher or the students could not see or hear each other well enough to communicate easily.

Mr. Callum was hampered by the fact that he could not pick up student cues and expressions because of the visual quality of the technology. The camera range also prevented him from seeing all the Durham students at one time, unless he scanned with the camera. Bauer and Rezabek (1992) found that restrictions in visual contact between distance education sites may complicate interaction between the teacher or the two groups. This certainly proved to be the case with the Hillview-Durham classrooms, at least with the visual quality that was available.

Perhaps the biggest technological concern for Durham students was not being able to hear the students in the Hillview class well, or in many instances, at all. If any one feature of the system hampered the Wheatbelt's goal of providing an opportunity for personal interaction even while using a distance education medium, this was it. The effect of poor sound was to make the flow of each lesson tedious for the students and teacher. Melanie's analogy of the relayed telephone conversation is apt:

> It's like you're talking on the phone and, "oh, what'd he say?" and that person will tell you what he said, then, "oh, tell him this", and then, like we have to go through him all the time. (I, Oct. 7, p. 4, M)

The PictureTel keypad's ease of use was described as an advantage by Baird (December, 1991) in his comparison of three compressed video systems. For the students who used it, this certainly seems to have been the case. However, some students could play with the keypad by zooming in on people in the other classroom or turning the volume up or down at will.

A major weakness of the PictureTel keypad was that it restricted the movement of the teacher. Baird (1991) also found this in his study.

Baird (1991) also mentioned that the PictureTel monitors "picture-in-picture" feature was a strength of the system. For the Durham/Hillview classes, this was a positive feature for close-up images of distant individual students, but there was no second monitor to see the rest of the distant class. Durham students liked having two large monitors (one of their

class, one of the sending class) as opposed to Hillview's smaller, single monitor. They could see a much larger image of themselves than they would have in the smaller "picture-in-picture" screen of the Hillview monitor, but this may have made some of them, like Joanne, more self-conscious about their screen appearance and mannerisms.

Perhaps, the sequential nature of some classes such as mathematics may have been easier to teach over the system. The potentially interactive nature of Law 30 and other similar subjects may have been limited by the inherent limitations of PictureTel like sound quality and restricted mobility. Willis (1992) maintains that the course content and delivery system must be compatible.

Interpersonal Interaction

Teacher presence. Dede (1990) and Hackman and Walker (April, 1990) discuss the need for distance teachers to have an attractive "telepresence." Mr. Callum was an articulate, humorous man with a loud, clear speaking voice which were personal advantages for him when teaching. However, when he visited the Durham classroom, his personal appeal was much stronger and the Durham students were totally focused on him. His "distant" presence seemed muted in contrast. On screen, we usually saw him seated behind a table or standing close to the keypad which restricted both his mobility and animation.

Teacher affectiveness. Willis (1992) mentions the teacher "affectiveness", the ability to understand students' needs and feelings, which can be lost through a distance education medium. Durham students seem to miss the aspect of a traditional classroom in which students get to know and interact with the teacher, both in and outside of the classroom. Mr. Callum had a warmer relationship with his Hillview students because he knew them from before, at least to some degree, but he was also physically present in their classroom. The Durham students did not have the same opportunity. Valarie thought it might have helped to develop student-teacher rapport if the Durham class and Mr. Callum had a chance "to meet two or three times before the class started to get to know him" (I, Sept. 7, p. 5, V).

After Mr. Callum's visits to the Durham classroom, the receiving students were more attentive in the following classes. This may have been a instance of the Hawthorne effect.

Teacher expectations. Norenburg and Lundblad (1987) suggest great care must be taken at the beginning of and throughout a course to ensure that course requirements and teacher expectations are clearly stated. In traditional classes, some of these are conveyed informally, but in distance education this must be done in a detailed up-front manner to avoid student misunderstanding. Although Mr. Callum did spend time the first day doing this and reminded students of various expectations throughout the next few weeks, the Durham students were resentful about certain aspects of the Law 30 course and the class format. They felt they had not been adequately informed of the tutorial format of the class, where assignments, questions, and readings were to be completed outside of class. Melanie was angry about the stipulation to use a Canadian news article instead of an American one for the news article assignment. She also felt that she had received this information "after the fact." As well, Joanne was confused over the issue of rewrite exams. In every class, there are students with poor listening skills, but in traditional classes it may be easier for the teacher to pick up on which students have not understood instructions by certain student non-verbal cues, usually leading to further clarification on the part of the teacher.

Discipline. Maintaining classroom discipline can present special problems for teachers and their distant classroom. Unlike the Oklahoma Panhandle Shar-Ed Project, Mr. Callum or Mr. Green did not meet with the Durham students and/or parents prior to the class starting to discuss and clarify the rules and procedures of the class. Assumptions were made by both Mr. Callum and the Durham students about discipline and these views did not coincide. Mr. Callum thought his reputation and position as principal of Hillview school would help to prevent discipline problems occurring in the Durham class. There was also an understanding between the principals of the PictureTel schools that misbehavior would be dealt with through an administrative team approach. Durham students viewed Mr. Green, the Hillview principal, as the "heavy" when it came to discipline matters because, after all, Mr. Callum did not "seem too scary from Hillview" (I, Oct. 8, p. 4, Y).

Teacher strategies. Mr. Callum mainly used teacher-led discussion to cover the content of Law 30. The exception to this format was the occasion the students made their news article presentation and the student discussion following. Even then, most Hillview student comments and questions were usually relayed by Mr. Callum because otherwise

these students could not be heard by those of us in Durham.

Two weaknesses emerge from the use of the tutorial format. Some of the Durham students were unable or unwilling to prepare adequately for class. Secondly, there was little, if any, informal time during the class for students to do assigned work or to break off into small discussion groups.

The steady pace of teacher-led discussion, rarely broken up by any other activities, meant that some students became visibly tired or engaged in off-task behaviors as the class wore on. The Law 30 class was also in the last period of the day.

Teacher/Student dialogue. Unlike Barker and Patrick (1988), I did not analyze the amount of respective teacher and student dialogue using percentages. Nevertheless, by doing a simple count from my observation notes, there was considerably more teacher talk than student. Much of this was instruction and questioning, but a certain amount of the teacher's conversation was relaying the Hillview students' questions and responses to the receiving class in Durham. The Durham students were frustrated because the teacher had to act as an intermediary for communication between the two groups.

Teacher questioning. Mr. Callum felt that he had checked for student understanding more than he would have in a regular class because he was not physically present in the Durham class and many of the student non-verbal cues were lost due to the picture quality. The loss of many non-verbal cues from students was a major problem for Mr. Callum and, I believe, would be in any distance education classroom of this type. Withitness, the "eyes in the back of their head", the wonderful "sixth" sense that many teachers develop, was largely lost.

Another problem developed from teacher questioning of receiving students. Most of the students came to feel picked on because they were questioned so frequently.

Student interaction. The type of developing interest between Joanne and a Hillview boy is an aspect of distance education that is mentioned in other studies using compressed video. The technology has promises for broadening the social horizons of students of small rural high schools if they do not let old school rivalries get in the way.

Mr. Callum's notion of improving Hillview-Durham student interaction by having them work on combined projects together might be awkward to arrange but that and other

group activities such as field trips would build the sense of being one class. To some degree, the news article assignments brought an exchange of questions and comments between the presenters and their classmates in both classrooms. There was no formalized socialization outside of class time as was the case in the Kansas system (August, 1989). Some Durham students mixed informally with those from Hillview at volleyball games and rodeo dances.

Facilitators. Although facilitators were present at the receiving end of other projects using compressed video technology, Wheatbelt did not use them. The principal, Mr. Green, was usually in the room sometime during the class and the Durham library technician acted as the exam proctor. The students believed, and I agree with them, that an in-class adult presence was needed.

Mr. Callum believed the Durham class did not have to have a facilitator because he wanted them to learn to manage on their own. "They've got to take some responsibility on themselves and it's like it's this umbilical cord they've been attached to for so long and now it's severed. They've got to function on their own" (I, Oct. 12, p. 18, T). Perhaps it was too big a step for the inexperienced PictureTel students to make.

Facilitators might have been used in a variety of ways. Their presence may have helped the students overcome some of the initial dissatisfaction and awkwardness they felt using the system. Supervision would also have been provided for the disgruntled students taking Law 30 only because of the new school division policy. If telephone rates made small group or individual work time during class too expensive to be "on air", this would have been a suitable time for the receiving class to disconnect and to proceed with their own work under the facilitator's supervision.

Additional Demands on Participants

Student views. Student attitudes and feelings toward taking a PictureTel class at the beginning of the school year could be summed up as somewhat reluctantly reconciled to it. Katherine described it best: I don't particularly like it, like it's hard to learn because there's so much extra stuff going on there's always another distraction ... it's definitely not the way I'd ever take a class if I had an option" (I, Sept. 7, pp. 6-7, K).

By the second round of interviews in October, students were visibly frustrated and

three of the student participants did little, if any, work in class. When they were interviewed, the students were quick to recognize problems or flaws in the system, but rarely did they offer any possible solutions. The issues of the class format and the school division policy of full student timetables seemed to be as much of a concern to the students as coping with the technology itself.

Of all the students, Katherine coped best with the technology and was the most successful student, but she had concerns about the costs of the system. "I'm not sure sometimes it's worth what it's costing them [the school division]. Like if they're going to put a value cost, there are a lot of kids who aren't learning anything, too" (I, Oct. 8, pp. 17-18, K). Her viewpoint had not changed by our November interview:

> It's a hard system to learn on. It's, unless you've got people who absolutely want to learn on it ... you have someone in there who's distracting, because ... they're a distraction to the person trying to learn and ... because you can't hear, you can't see. (I, Nov. 8, p. 6, K)

Yvette did not have as much self-discipline or motivation as Katherine, but she was active when she had to be.

Joanne and Melanie were eager to be interviewed in October, too, perhaps because they saw this as an opportunity to complain. Joanne was still making some effort to pass the class, but Melanie was not. I am puzzled why Valarie did not do better in Law 30.

Teacher views. When I interviewed Mr. Callum in October, he was also frustrated with the limitations of the PictureTel system and teaching two classes simultaneously. He raised several concerns. He wondered how and if school climate or ethos comes into play in this situation because the two classes seemed to have different attitudes toward him, the PictureTel system and taking Law 30. He also worried about teaching high school students as compared to his area of expertise - middle years. He also saw me as "another variable" (F, Oct. 12, p. 30).

Staff inservice and monitoring. Moore and Thompson (1990) address the importance of not only having educators learn to operate the distance education technology, but to learn to incorporate the technology into instruction and organization. This approach seems to have been the case in the Wheatbelt School Division regarding inservice. Monthly

meetings were held for PictureTel teachers to discuss successes and problems that they were experiencing. My interviews with Mr. Callum indicate that Mr. Callum and Mr. Green (Durham principal) had informal discussions about the teaching process. When Mr. Green, an experienced PictureTel teacher, visited the Durham classroom, he rarely stayed more than 10 to 15 minutes; however, there may have been more monitoring of Mr. Callum than I saw. There had been no formal mentoring system established and PictureTel teachers were not formally supervised.

Summary of Reflections

Individual differences have an impact on how each participant deals with the learning process. There will be different reactions to the same social situation because, after all, classrooms are ultimately social situations. The planning for distance education should take into account those students who will not or cannot fit the components of distance learning together. The organizers and teachers of distance education courses must recognize that there will be some of these students and plan for them. High school students, even those who were in their senior year, did not display adult learner characteristics, except perhaps Katherine. "Adults who are most likely to complete courses using distance education technology have a cluster of important characteristics, such as tolerance for ambiguity, a need for autonomy, and an ability to be flexible" (Threlkeld & Brzoska, 1994, p. 54).

Morgan (1991) says that all social settings have political dimensions. Case-study research can be useful in uncovering these. The Wheatbelt had an implicit desire for the PictureTel system to succeed. By going on their own as opposed to using the provincial SCN system, they had taken a risk. However, the implementation of a full time-table policy by the school division made the Durham students angry. They wanted some control of their work day and as a result, some of the Durham students would likely have been happy to see the class flop.

The type of relationship between Mr. Callum and each group of students appeared to be different. Because the Hillview students were physically present with the teacher, they enjoyed an informal social relationship with him besides a formal one. The Durham students had only a formal working relationship with Mr. Callum, since there was little

opportunity to develop anything more.

The technology also affected the power relationships between students in the same class. Some of the Durham class were comfortable with the technology, some were not. The keypad allowed certain students to control camera focus in either class. Joanne and the Hillview boy seem to be mutually interested in each other. What if one of them, particularly her since she did not actually use the keypad, (her friend Yvette did), was not interested but still pursued by camera and bothered by these more technically component boys at Hillview? I wonder if this would be a case of harassment by camera?

Once the technology was operative in the PictureTel classrooms, the communication between student and teacher became a crucial factor. The compressed video technology made it easy for students to "hide" from the teacher. It was also difficult for the teacher to determine whether the students were following and responding to the teacher's verbal pace. The teacher's sensitivity or withitness to student non-verbal cues and behavior was limited. Also the issue of <u>real</u> physical distance may be a factor. Would the receiving students still feel "at a distance" if the picture and sound quality were technically perfect?

Like Mr. Callum, I want to see rural Saskatchewan develop its own answers to problems such as declining enrollments. Distance education methods have limitations but they may also be a possible, partial solution. However, if a distance education medium is going to be used, every possible measure to avoid failure must be taken through careful organization and advance preparation of high school students taking distance education classes.

Suggestions to Participants

The purpose of this study was not to evaluate the Law 30 program. However, many ideas came to mind that may be useful to direct or indirect participants of a project of this type. The suggestions are grouped according to theme:

<u>Technology</u>

1. That a pre-class training program be instituted allowing teachers and students to work with the medium.

2. That the class should not start until the technology and rooms are appropriately set up. High school students appear to have a low threshold for frustration

with the medium.

3. That teachers using the medium, experiment with a variety of teaching strategies.

4. That teachers using the medium meet together to discuss strengths, weaknesses, and coping strategies for using the system.

Interpersonal Interaction

1. That informal social meetings (i.e., over a meal) take place before the course starts for three reasons. First, to practise with the technology (i.e., charades, I am ...); secondly, to meet and develop some rapport with other participants; thirdly, to forge a group identity (i.e., We are special, we're the PictureTel class ...).

2. That students be supported beyond what is typical in a traditional classroom. If students do not initiate contact with the teacher, the teacher may have to call each student on a monthly basis at school or at home.

3. That the value of facilitators for improving the effectiveness of a distance education program be considered carefully. A facilitator may act as the "human bridge" between the distant students and teacher.

4. That if no facilitator is used, distant students be closely supervised initially (perhaps the first month of the course). This may be a kind of coaching to make sure they are comfortable with the system.

Additional Demands on Participants

1. That learner analysis (Thelkeld & Brzoska, 1994, p. 54) take place before the course starts as to what types of learners will be involved.

2. That if students are taking the course because they perceive a school or division policy is forcing them to, a facilitator should be present in the class on a full-time basis.

3. That the teacher sit in the receiving classroom while someone else teaches at the sending end from time to time.

4. That a formalized system of mentoring be instituted among teachers presently using, or experienced in using, compressed video technology.

Suggestions for Further Research

The student participants in this study offered many views about learning in the receiving classroom of a distance education project using compressed video technology. The teacher, Mr. Callum, presented his approaches to instruction and his views about teaching in the transmitting classroom of such a project. The students were often critical of the teaching/learning process. Sometimes student views were very different from each other; other times, there was considerable agreement among the group.

The study of learning in distance education that only studies the effectiveness of certain learning activities or new curricula is not enough. It should not simply be a study of the application of a new technology either, because technology is only part of the environment.

We need naturalistic studies in distance education to illuminate how students approach their studies and why in the ways they do. We need to be concerned with student's overall learning experience and not just the outcome (a credit for a class).

My study was primarily descriptive in nature and not evaluative. However, a certain element of evaluation has crept into this study. Descriptive studies can provide us with a broad base of information about a particular situation, but other potential dimensions must be kept in mind - PictureTel has different capabilities than other types of compressed video like Full Motion, far less comparing it to other types of interactive television. The use of a "bridge" where more than two schools might be taking a class at one time, as opposed to the "point-to-point" system presently in use in the Wheatbelt School Division, would also present another dimension for study of distance education using compressed video technology. Different courses make different demands; teaching Law 30 over PictureTel is different from a mathematics class. Even though this type of study gives us a tremendous amount of information, it is only one kind of distance education context.

I also wonder if it is essential that the sending and receiving students interact with the other group. As long as each group of students communicates well among themselves, is there a purpose or necessity of the two classes interacting? This issue merits further study.

Distance education provides opportunities, but also creates challenges.

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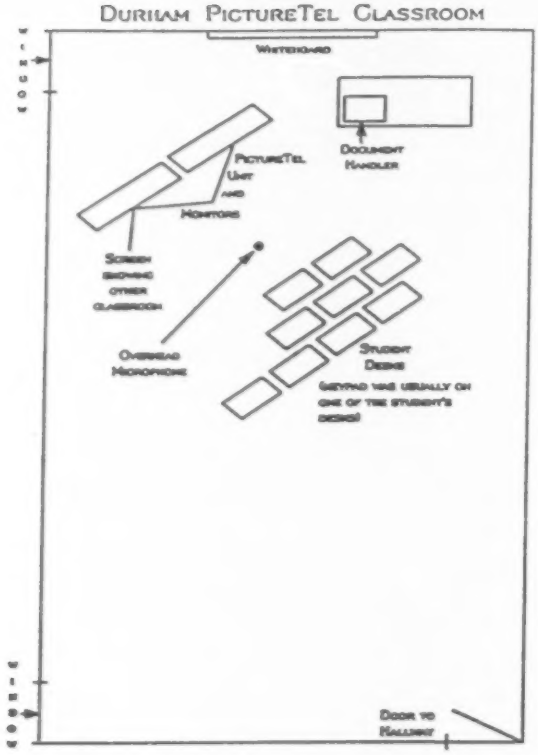
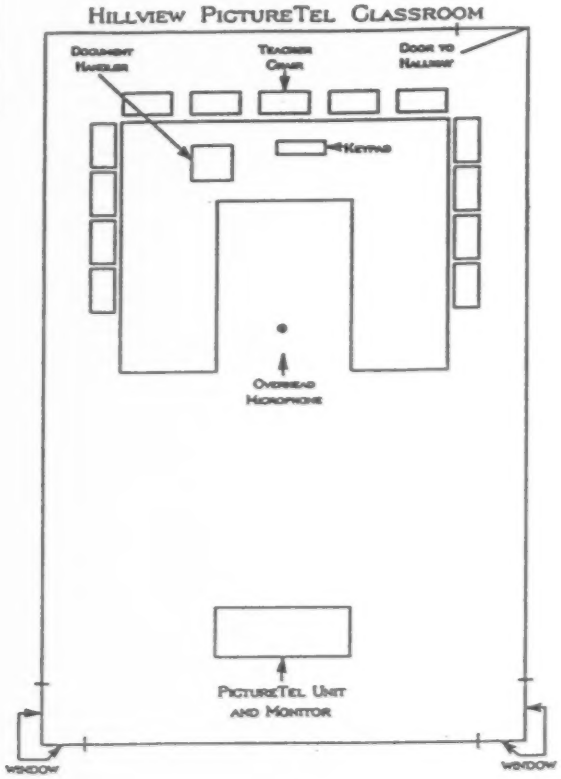
APPENDIX

Diagrams of Sending and Receiving Classrooms